VOLUME 34 FEBRUARY 1941 NUMBER 2

Southern Medical Journal

Journal of the Southern Medical Association

Copyright, Southern Medical Association, 1941. Published monthly by the Southern Medical Association, Empire Building, Birmingham, Alabama. Annual subscription, $4.00. Entered as Second-Class Matter at the Post Office at Birmingham, Alabama, under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized December 20, 1921.

Southern Medical Association, Thirty-Fifth Annual Meeting, St. Louis, Missouri, November 11-14

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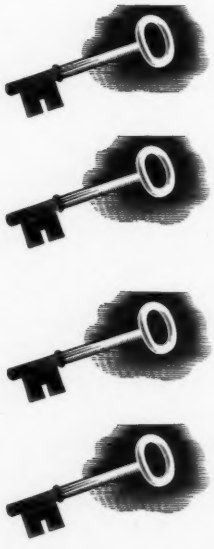

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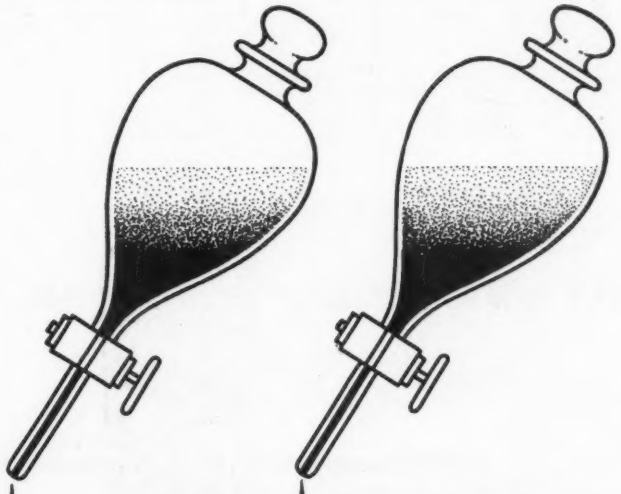

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1 Archiv. of Path., Feb. 1929.
2 Soc. Exp. Biol. & Med., May 1929.
3 Soc. Exp. Biol. & Med., 45-361, 1940.

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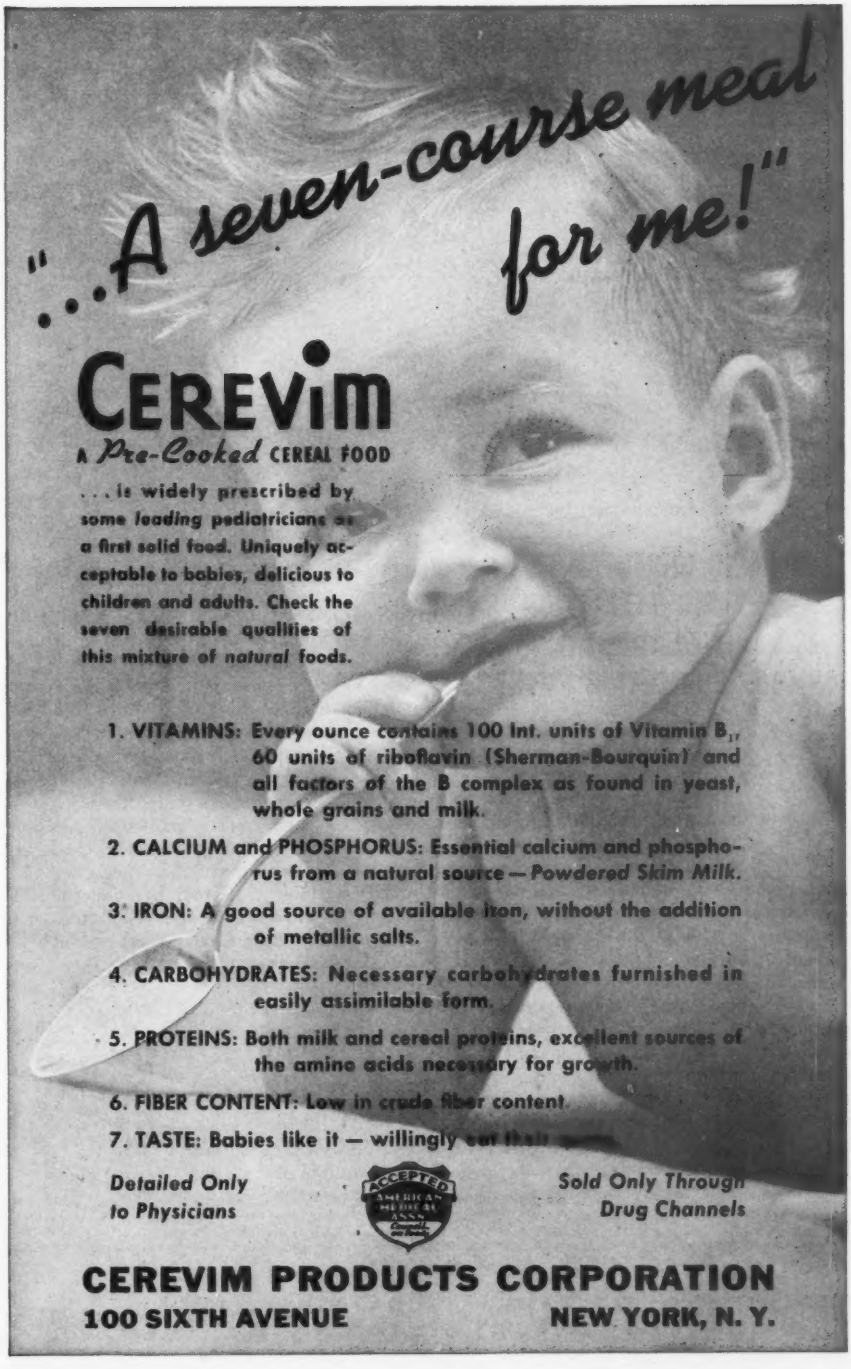
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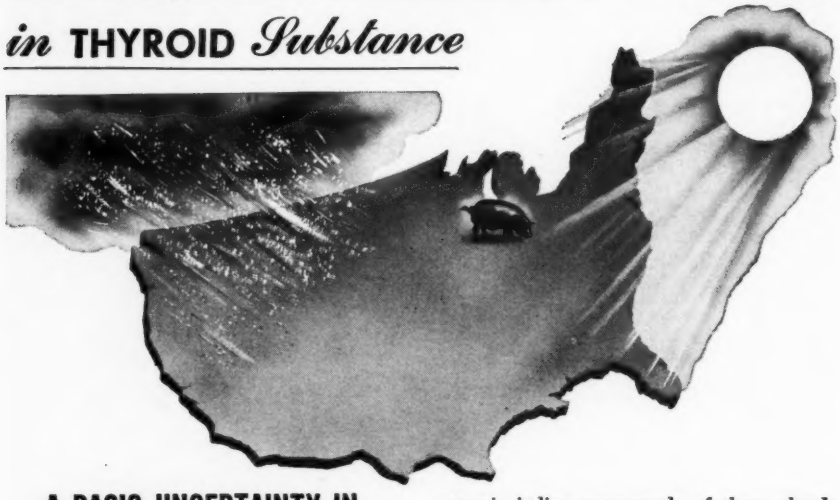

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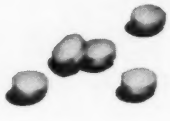

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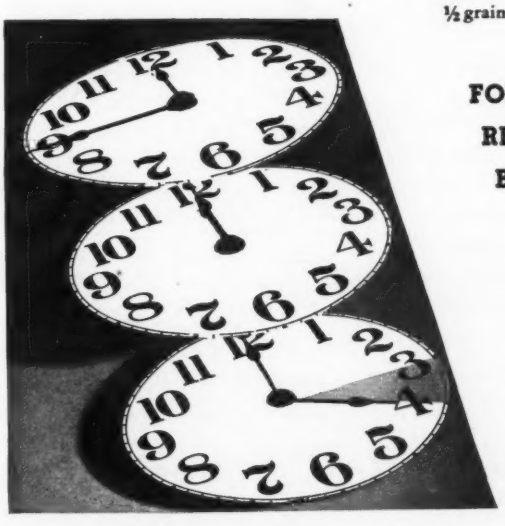

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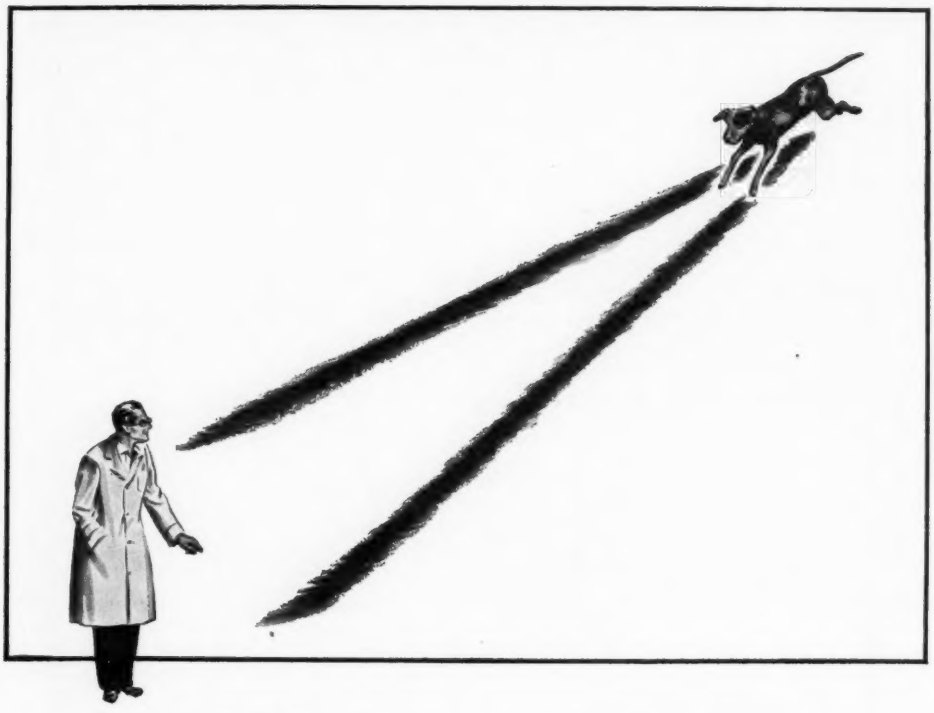

The Conquest of Pellagra

In the annals of medical science few discoveries have been more notable than that of the dramatic role nicotinic acid plays in the treatment of pellagra.

Although earlier research workers had devoted much effort to the problem, it was Dr. Joseph Goldberger and Dr. W. H. Sebrell who, in 1930, supplied the necessary clue by their discovery of the beneficial effect of liver therapy in this deficiency disease.

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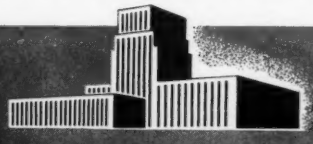

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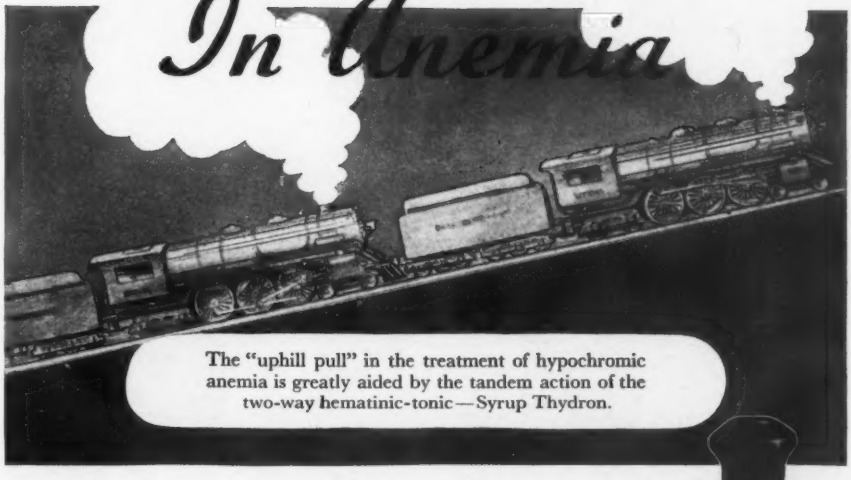

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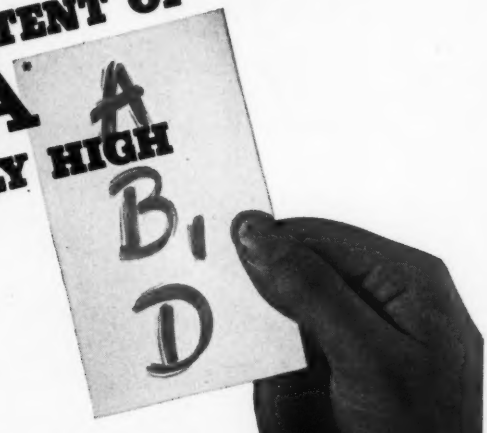

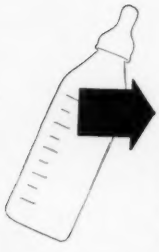

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1. Dornbush, A. C., Peterson, W. H., and Olson, F. R.: "The Carotene and Vitamin A Content of Market Milks." J.A.M.A., May 4, 1940, pp. 1748-1751.
" " "

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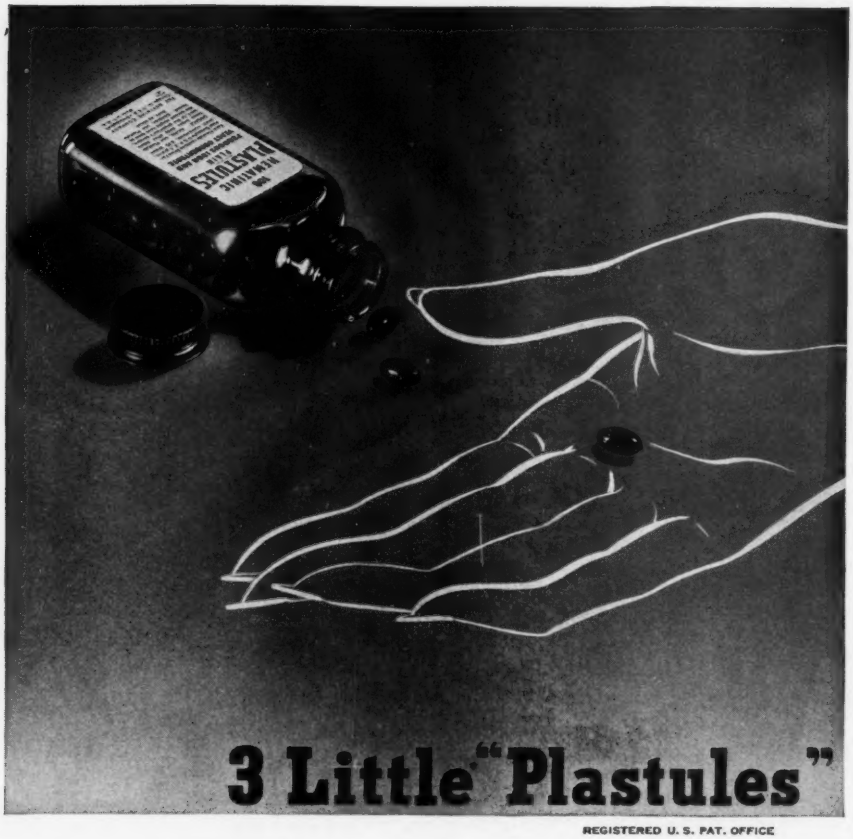

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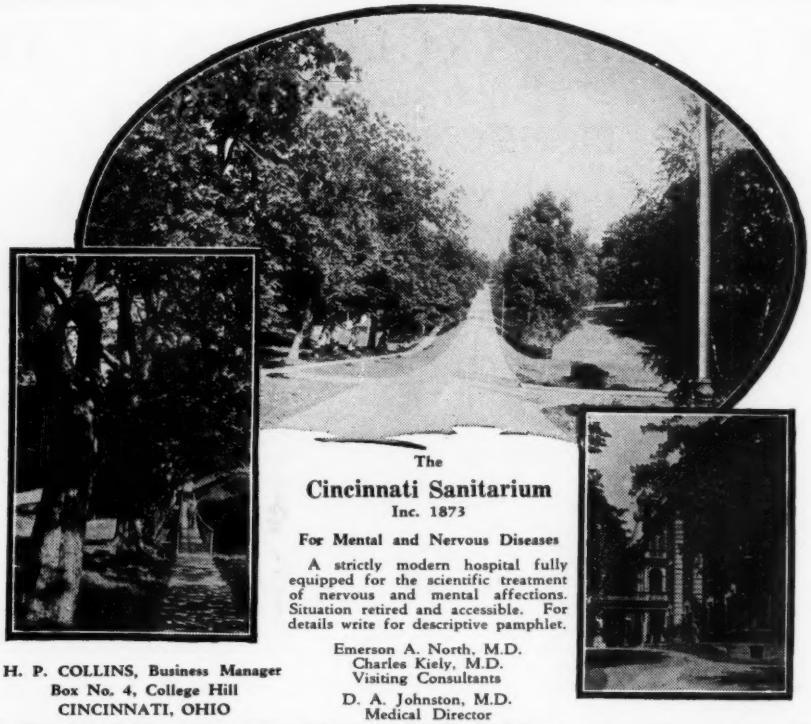

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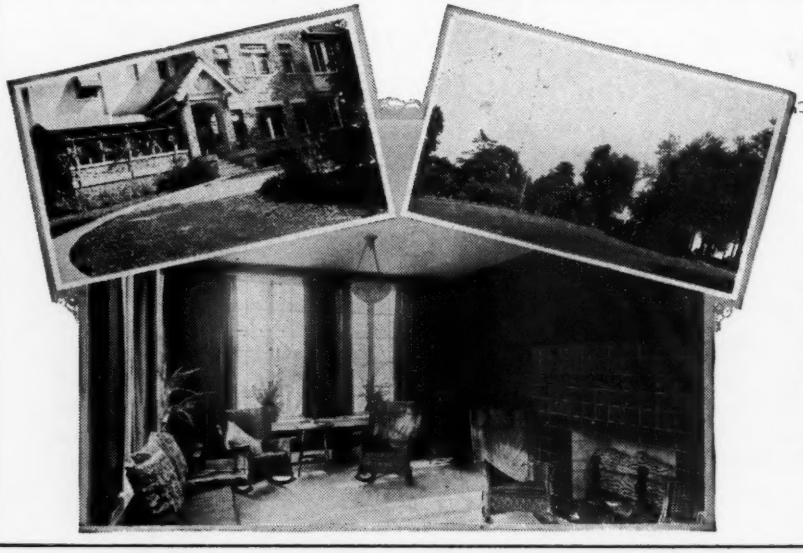

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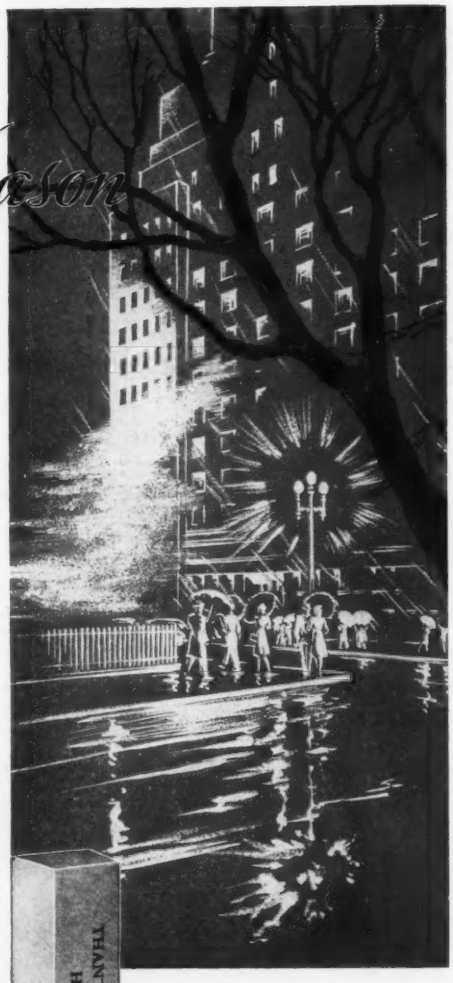

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SOUTHERN MEDICAL JOURNAL

JOURNAL OF THE SOUTHERN MEDICAL ASSOCIATION

PUBLISHED MONTHLY BY THE SOUTHERN MEDICAL ASSOCIATION AT BIRMINGHAM, ALA.

Volume 34 FEBRUARY 1941 Number 2

MUSCLE PATHOLOGY IN ANTERIOR POLIOMYELITIS*

ITS RELATION TO FUNCTION

By HERBERT E. HIPPS, M.D., F.A.C.S.
Marlin, Texas

It has long been considered that if a partially paralyzed muscle has had adequate rest, bracing and physiotherapy for a period of two years or more, then all that can be done for that muscle has been done. No further increase in strength can be expected, and operative procedures to replace that muscle's function are then considered to be indicated.

Through a grant from the National Foundation for Infantile Paralysis an intensive study of the gross and microscopic pathology of poliomyelitic muscles has been made. As a result of this study, it has been found that many of these muscles that have been adequately treated for two years can be further strengthened by an operative procedure on the muscle itself. The intrinsic power in the muscle can be increased.

It was interesting to note in making this study that an abundance of material has been written on the pathology of the anterior horn cells, but that practically nothing could be found on the gross pathology of the muscles.

Some work has been done on the microscopic aspects,[1-7] but previous gross studies[5 7 8] have been very inadequate and consist simply of descriptive statements such as "The muscle is replaced with fat," "The muscle looks like fatty bacon," and other totally unscientific and inexact descriptions.

The primary impetus for this study was furnished by the dissimilarity in size of two children's paralyzed legs. Both children were the same size, and both children had the right leg paralyzed; but in one, the leg was nearly as large as the normal leg, whereas in the other the leg was thin, shrunken, and markedly atrophic.

In both children, however, the muscles all graded zero, and the foot was entirely flail.

Several months later in doing a biceps femoris transplant to the patella on a patient whose quadriceps graded trace, the muscle, as in *Fig. 1,* was partially and then almost completely visualized.

In this case it was easy to see why a contraction of the muscle belly itself would be ineffective. The pull was simply on the intervening fibro-fatty mass and was not transmitted to the patella tendon; yet there lying within that muscle belly above the fibro-fatty zone was enough power to function almost normally in the leg, if that power could be utilized.

This case, plus the previous observation and many similar instances of dissimilarity in size of paralyzed limbs, led to the possible conclusion that many of these muscles with a remaining paralysis could be benefited by accurate knowledge of the pathology.

HOW THE STUDY WAS CARRIED ON

Cases of two years' or more duration were admitted to the hospital and a standard operation was done that was needed. During the course of this operation, the incision was lengthened more than was necessary for the operation itself and considerable dissecting back of the skin was done so that a clear view of the entire muscle could be obtained in almost every case.

At the time of the operation a description was dictated to a secretary and photographs and sketches were made.

Each muscle was tested by mechanical stimulation for its ability to contract, and its elasticity and degree of tension was noted.

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*Read in Section on Bone and Joint Surgery, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

*From Crippled Children Hospital.

*Aided by a grant from the National Foundation for Infantile Paralysis, Inc.

Microscopic sections were taken from various parts of the involved muscles.

GROSS PATHOLOGY, SIGNIFICANCE, CLASSIFICATION

The gross or macroscopic changes occurring in the later stages of poliomyelitic muscles are: atrophy, degeneration, fibrous replacement and fatty replacement.[5 9-12] All of these pathologic phases occur in almost every muscle; but the degree of change varies so much that one muscle may show predominantly an atrophic change and another a fibrous replacement, or some other type of change.

The following classification of macroscopic poliomyelitic muscle pathology is based largely on this predominance of one change in each muscle. Since the microscopic picture of a muscle may vary from place to place in each muscle, this macroscopic classification seems most suitable and most accurate. It is also of considerable value as a help in interpreting the function of the muscles in the light of their pathologic changes. The following classification is considered of most value:

(1) Homogeneous atrophic and degenerative change
(2) Muscle replacement change
  (a) Fibrous
  (b) Fatty
  (c) Fibro-fatty
(3) Irregular atrophic and degenerative change

HOMOGENEOUS ATROPHIC AND DEGENERATIVE CHANGE

The homogeneous atrophic and degenerative change is the most common pathologic involvement found. It occurs in muscles of all sizes, but small intrinsic muscles are almost uniformly

Fig. 1

Muscle grade, trace. The drawing is made from description and memory of the case mentioned in the first paragraphs. It shows a zone of fibro-fatty degeneration with good muscle above and below.

Fig. 2

Muscle grade, poor minus. There are homogeneous atrophic and degenerative changes in the muscle. The greatly relaxed tendon is not commonly associated with this change. A contraction of this muscle belly merely takes up the existing slack in the tendon and does not pull on the foot.

affected in this way. It occurs in patients of any age and in paralysis of almost any duration.

The muscle is uniformly diminished in size and is homogeneous in color and general structure. It feels soft and is often greasy. It may be a faintly pink, greyish muscle mass, distinctly retaining the normal structure of muscle or a faintly grey, pink mass. It may be predominantly grey with uniform faint pink streaks of small size throughout, or it may be predominantly pink with grey streaks or just a pale pink, unlike the dark red of normal muscle.

These muscles are very atrophic and flabby. They usually contract when pinched, but do so feebly. They most often retain some elasticity, but not nearly so much as a normal muscle. The usual grade of these muscles is trace or poor. *Fig. 2* shows a muscle of this type with some relaxation present, although not all the muscles of this type are relaxed. If the slack is taken out of this tendon and the muscle tested for elasticity, it clearly can be shown that it is present even though it is a "stretched out" muscle.

These muscles are, therefore, uniformly or homogeneously involved in an atrophic and degenerative process and no other pathologic process is present to any degree macroscopically.

MUSCLE REPLACEMENT CHANGE

The group of muscles classified under "replacement change" is the least common type. Large muscles are most often involved. Small intrinsic muscles, except for the opponens pollicis, were not seen in this group. The age of the patient does not seem to be a related factor. The duration of the disease does seem to be of some possible significance, since all muscles showing this change were in patients who had had the disease for several years. This observation may not be of particular value, however, as all of the cases used in this study were of over two years' duration.

These muscles are definitely smaller than normal. The color is almost uniformly grey or yellowish grey. Occasional small pink streaks can sometimes be found, but when present are usually near the origin of the muscle. The muscle seems to be almost completely replaced by fibro-fatty tissue. In some muscles this change is predominantly fatty and in others it is predominantly fibrous; while in others there is a rather homogeneous fibro-fatty appearance. If it is chiefly a fatty replacement, the muscle will be somewhat greasy, flabby and soft. If it is chiefly a fibrous change, then the muscle will feel distinctly rough and irregular and may have a little tension in it. The muscles having no particular predominance of either tissue show an irregular network of fibrous strands throughout; and in between and all about these strands are irregularly ragged streaks, zones and islands of fatty tissue, about equal in amount to the fibrous tissue. In some areas of these muscles, of course, fatty change seems greatest, while in other places the fibrous change is greatest. The fatty change is nearly always greatest near the musculo-tendinous junction. The fibrous predominance may be anywhere in the remaining muscle, but often a narrow streak of fibrous increase is found running along the length of the muscle from the origin to the tendon junction that is about one-sixth

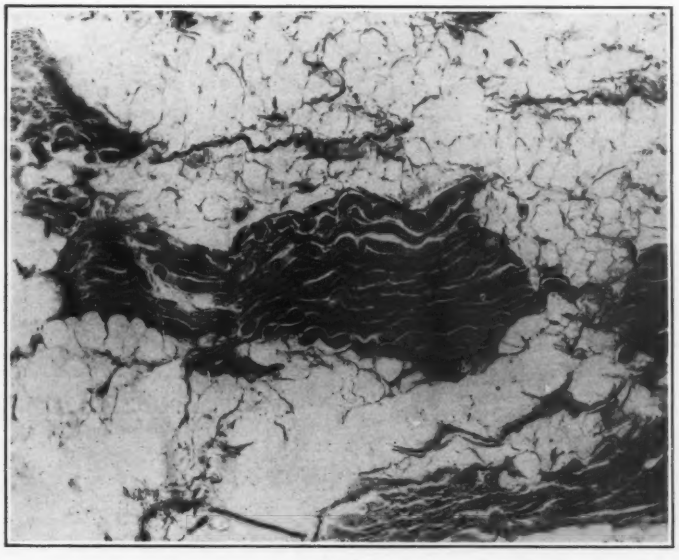

Fig. 3

This muscle is being completely replaced by fatty tissue. This also is an end stage, but the replacement tissue is predominantly fatty instead of fibrous. The cells of this island are undergoing various degenerative changes. Note the swollen fibers that show the mealy, waxy changes of beginning disintegration.

to one-fourth the width of the remaining muscle. It seems to be a line of fibrous replacement that has occurred as a reparative measure in a muscle which has been traumatized along this line of stress by repeated stretchings and tearings. These fibro-fatty muscles are so loose and are under so little tension as a rule that they hang down on the sides of the bone to which they are attached and change their position when the position of the limb is changed.

They will not contract when pinched and they have no elasticity. They will stretch; but when stretched, do not return to their former length. They usually grade zero. They look as if fibro-fatty tissue has completely replaced the original muscle mass and practically no vestige of the original muscle remains. In many cases it is necessary to study a microscopic slide to be sure that any muscle cells remain at all. *Figs. 3* and *4* show how muscles of this type look microscopically. They probably represent an end stage in the degenerative processes that occur in poliomyelitic muscles, a change similar to the "fibrous de-differentiation" described by Sarah Tower.[13]

These muscles, therefore, are hardly muscles at all. Atrophy, degeneration and replacement changes which seem to occur in paralyzed muscles in that order have changed the once contractile elastic muscle to a shapeless, formless, functionless mass simply occupying the space between skin and bone.

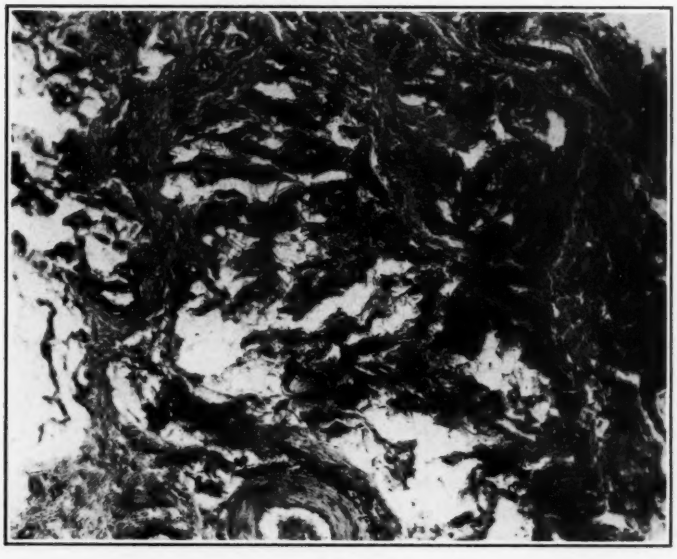

Fig. 4

The stage of complete fibrous replacement, an end stage in the atrophic-degenerative-replacement process that occurs in poliomyelitic muscle. A few small atrophic muscle cells may be found.

IRREGULAR ATROPHIC AND DEGENERATIVE CHANGE

The group that is the most interesting and is second in frequency is the irregular atrophic and degenerative change. It involves only the larger muscles. The age of the patient and the duration of the paralysis seem to be of no significance. There is no uniformity whatever in the color, shape, size or degree of atrophy and degeneration present in these muscles. It is this very lack of uniformity that makes these muscles interesting and places them in a group where advantage may be taken of their peculiar pathologic structure actually to increase the strength of the muscle by a surgical procedure.

Figs. 5 to *15* (except *Fig. 10*) show muscles in which the peculiar distribution of the pathologic changes brings them into this group. Because of the definite heterogeneity of these changes, a general description will not suffice, but each one or each type must be taken up separately and discussed.

Figs. 5, 6 and *7* show muscles which have a similar type of degenerative change. In all of these there is an atrophic and fatty or fibro-fatty change in the muscle at its attachment to the tendon of insertion. *Fig. 5* shows a tibialis anterior that graded fair plus. Exposure of the muscle belly disclosed a segment above that was nearly normal in appearance. It contracted on pinching, it was elastic and presented all the physiologic and anatomical evidence of normal or nearly normal muscle tissue. The lower fatty zone, however, did not contract and was not elastic. It stretched, but did not return to its original length when released. Obviously in this case a powerful contraction which occurs in the upper good segment of muscle cannot be transmitted to the tendon because of the

intervening zone of fatty tissue which is itself incapable of contracting or transmitting effectively the pull to the tendon insertion below. All of the power of the contraction in this muscle is lost because of this peculiar zone of fibro-fatty tissue.

Why would it not be possible to take advantage of this pathologic peculiarity and improve that muscle's strength? This could be done by weaving small strips of fascia lata mattress sutured into the good muscle belly above through the fatty zone to the tendon below. This would transmit the impulse directly from the good belly above, down to the tendon, and its power would not be lost in an ineffectual pull on the fatty intervening zone; or it might also be possible to inject a sclerosing solution into the fatty zone and transform it into a strong fibrous mass that would effectively transmit the pull of the good segment above.

Fig. 6 shows a gastrocnemius-soleus group in which much more than the lower one-third is degenerated. This muscle might be treated in much the same way as the previous tibialis anterior, but, of course, so much of the muscle is already gone that not much power could be regained. There would be in all probability as much power regained by this procedure as by transplanting one of the smaller lateral groups of muscles to the tendo-achilles.

Fig. 7 diagrammatically shows the findings in another case. In this particular patient a hip flexion contracture was being released. As the muscles were cut away from the anterio-superior spine, a large mass of dark red muscle could be seen bulging from the inside of the pelvis around the anterior end of the ilium, almost getting in the way of the operation. The pres-

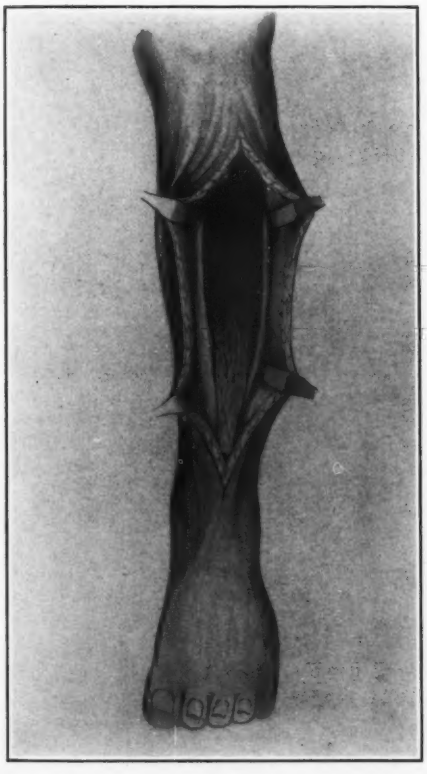

Fig. 5

Muscle grade, fair plus. There is a zone of degeneration about the musculo-tendinous junction. The muscle above is good. Contraction is ineffective because of a loose, weak lower zone which stretches and does not transmit pull to the tendon.

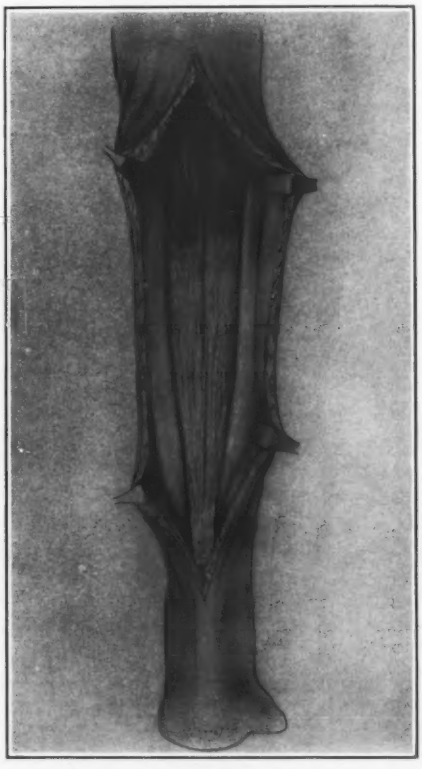

Fig. 6

The muscle grade is poor plus. All of the muscle is degenerated except a small part of both heads.

ence of so much good looking muscle there, in a child whose hip flexors graded zero, prompted further investigation. A zone of degeneration was found involving the lower one-third or one-fourth of the muscle, thus rendering its pull ineffectual.

Fig. 8 shows a quadriceps with the same general type of pathologic condition. Why would it not be possible here to dissect away the fatty zone and suture the vastus lateralis and medialis to the rectus femoris and the central tendon, thus making a narrower muscle, but making the contraction from all of these muscles effective by eliminating the loose tissue in between the good muscle and the tendon. This procedure would be very simple and possibly would improve that muscle's strength.

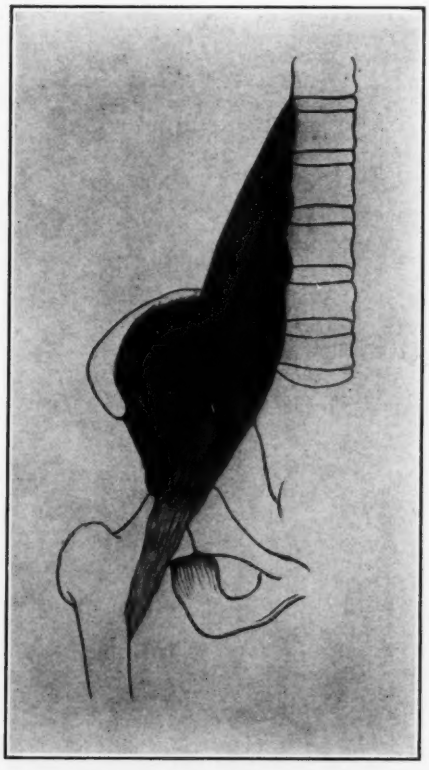

Fig. 7

The muscle grade is zero. Diagrammatic representation of approximate findings. The child's hip flexors graded zero, yet good looking ilio-psoas muscle was seen bulging around the anterior end of the ilium in doing a Soutter operation. The muscle, as high as it could be seen, looked uniformly good. Below, it presented a degenerated fibro-fatty tissue zone.

Fig. 9 is another muscle similar in its pathologic appearance to that of *Fig. 1.* The intervening zone of fibro-fatty tissue here, too, completely eliminates transmission of the impulse from the upper segment and makes the contraction of the lower segment less efficient because it is not firmly fixed above. This might be drawn together with mattress sutures of fascia with some expectation of improvement in muscle action.

Speculation on the origin of this zone is interesting. It may be a tear in the muscle that occurred in the early stage when the patient tried to walk too soon. If ruptures can occur in relatively normal muscles, as Gilcrest, Milch,[14] Conwell and others have demonstrated, then certainly they may occur in weak poliomyelitic muscles unduly strained. It is not likely that such a tear occurs suddenly with dramatic violence so

Fig. 8

Muscle grade, poor plus. Note the fatty streaks through the medialis, musculo-tendinous degeneration of the lateralis, and streak of degeneration down the middle of the rectus femoris.

that the patient can remember exactly when it may have occurred. A stretching out or "stretch tear" localized at one zone, growing greater with each attempt to overuse the muscle, is the most likely mechanism of such a gross tear.

In this particular patient, pressure of a brace calf band might have been the etiologic factor. This zone, however, is not definitely transverse like a calf band, yet it must be considered as a possibility. Not enough gastrocnemius-soleus muscles were studied to determine accurately whether calf band pressure damages the muscle or not.

Fig. 10 shows the homogeneous atrophic and degenerative change involving the two lateral heads of the triceps, while the central head shows good muscle except for the lower one-third, where it attaches to the triceps tendon. This muscle, therefore, shows a combination of the above pathologic classifications in the same muscle. This is a common finding in multiple bellied muscles.

The type of atrophy and degeneration seen in *Fig. 11* is very common in the opponens pollicis. This particular muscle seems to be the only one of the small intrinsic muscles studied that does not present almost uniformly the homogeneous atrophic and degenerative change. Here it is noted that a streak of fairly good muscle remains about the middle of the muscle belly. The streak on the extreme ulnar side is almost completely gone and is largely fibro-fatty tissue, but the margin on the radial side is faintly pink about the center and has good fibers at both ends.

The vastus lateralis in *Fig. 12* represents a commonly found type of change. Small irregular islands of muscle tissue lie at irregular intervals in a sea of fat. There is not much fibrosis in the surrounding tissue about these muscle islands. The islands themselves seem to be undergoing

Fig. 9

Muscle grade, poor. There is a zone of fibro-fatty degeneration across a fairly good muscle. A contraction in either muscle belly is ineffectual because of this zone. This may have resulted from a stretch tear or perhaps from the pressure of the calf band of a brace.

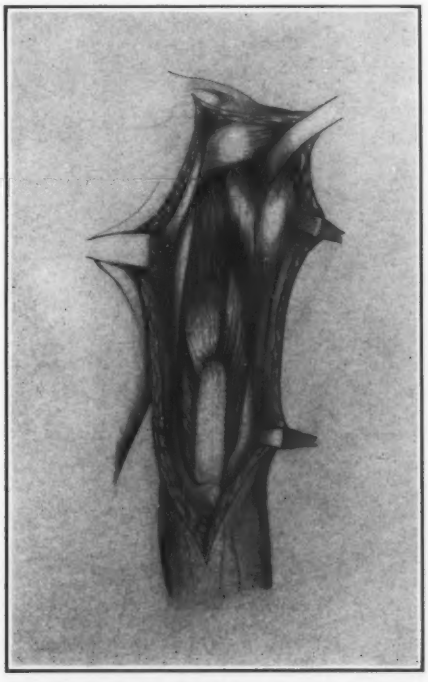

Fig. 10

The muscle grade is poor. The two outer heads show homogeneous atrophic and degenerative changes. The middle head shows a musculo-tendinous zone of degeneration.

a considerable amount of degeneration. The vastus medialis is similar to other muscles already mentioned, but the rectus femoris demonstrates a change not yet described. Notice the streak of degeneration running down the middle of this muscle. The lateral and medial margins of this muscle and the underlying intermedius are relaxed and flabby and simply hang over on the sides of the bone. It seems that a streak of degeneration has occurred down the exact center of these muscles that is of a very marked degree and is separating the muscle belly into a medial and a lateral portion with the femur almost exposed anteriorly separating them.

It is easy to theorize that gravity pull was greater than the remaining inherent tension in the muscle after the paralysis, so it simply fell off to the side as the atrophic and degenerative changes occurred in the muscle. A prolonged period of immobilization in a perfectly normal muscle produces a "flat top" appearance to a thigh. It is, therefore, possible that the too prolonged early immobilization of these muscles may pull them down into this shape just as it would a normal muscle, and as a result then of this position a "stretch tear" occurs along the anterior surface of the muscle over the femur.

Regardless of its pathogenetic factors this muscle (rectus femoris and vastus intermedius) is badly damaged and the probability is that little can be expected in its recovery, particularly since the two lateral segments are themselves showing degenerative changes of the homogeneous atrophic and degenerative type.

It might be interesting in this quadriceps to see whether any power could be regained by the following procedures:

(1) If we should do the special sliding operation, to be described later, on the rectus femoris

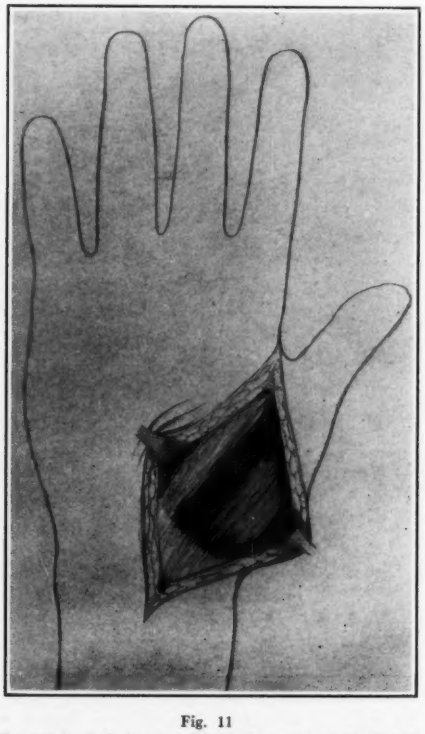

Fig. 11

The muscle grade is zero. The dark central streak is good muscle. The ulnar side is completely gone.

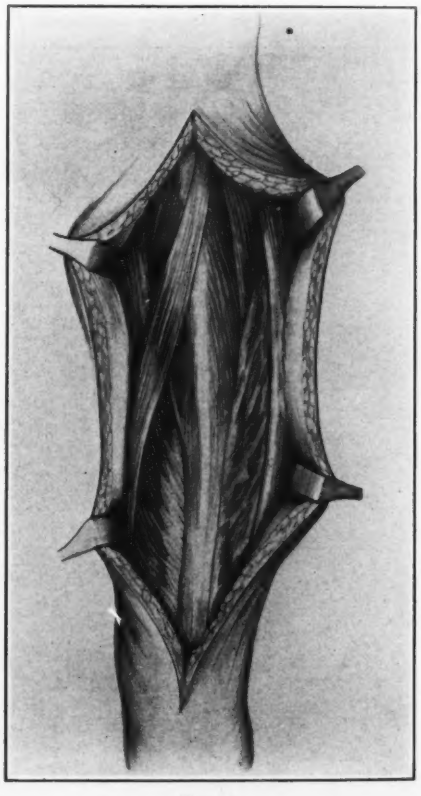

Fig. 12

The muscle grade is zero. The medialis is ineffective because of a musculo-tendinous zone of degeneration. The lateralis is ineffective because the islands cannot contract together effectively in fatty tissue. The rectus femoris is very weak, although uniformly involved. The muscle hangs down on either side of the bone and changes position with change of position of the limb.

and vastus intermedius and suture them together over the front of the femur after freshening up their adjoining portions.

(2) Special sliding operation on the vastus lateralis for possible coaptation of the muscle islands to occur.

(3) Suture the vastus medialis to the tendon with fascia lata.

In *Fig. 13* the rectus femoris shows the common, already described, type of irregular change and almost complete replacement of the vastus lateralis. The medialis might perhaps be strengthened by the plication procedure, although there is considerable atrophy present in the remaining muscle, and there might not be enough inherent remaining power to make it effective, even though its mechanical disadvantage is corrected by the surgery suggested.

Fig. 13

Note the small amount of good muscle near the central tendon. There is complete degeneration of the vastus lateralis and partial degeneration of the medialis. The rectus femoris is the only portion of this muscle that has any remaining strength.

It seems that the possible variations of irregularity in the quadriceps group are very numerous.

The deltoid in *Fig. 14* is a common finding and every orthopedic surgeon and physiotherapist has seen this particular type of irregular degeneration. The anterior and posterior parts of the deltoid remain as active functioning units. Often only the anterior part remains and sometimes only the posterior part remains, but most often both anterior and posterior zones remain, and the intervening zone as pictured here, that forms the rounded mass over the tip of the shoulder, is completely gone and replaced by a thin sheet of fibro-fatty tissue.

The muscle represented here, or deltoids of this type, even though greatly weakened, might still have enough power to abduct the arm against gravity if full mechanical advantage could be taken of the remaining muscle. Why

Fig. 14

Muscle grade, trace. This is a common finding in paralyzed deltoids. The middle zone over the tip of the acromion is completely replaced by fibro-fatty tissue.

could not these remaining portions be dissected loose from their present origin in front of and behind the shoulder and pulled closer together and reattached to the tip of the acromion, thus making a triangular muscle, just as the normal deltoid is, but, of course, one that is narrower at its base? This muscle, instead of actually pulling the humerus into some adduction with a contraction, would then pull it into abduction, and thus an actual improvement in that muscle's function could be expected; not particularly because the muscle strength was much improved, but because a better mechanical advantage could be taken of the remaining fibers.

The high percentage of deltoid muscles that show this type of irregular degeneration suggests that the "stretch tear" injury secondary to gravity pulling down on the arm and stretching the muscle over the tip of the shoulder is the important secondary factor that produces muscle disintegration, just as it does along the anterior surface of the femur in the quadriceps.

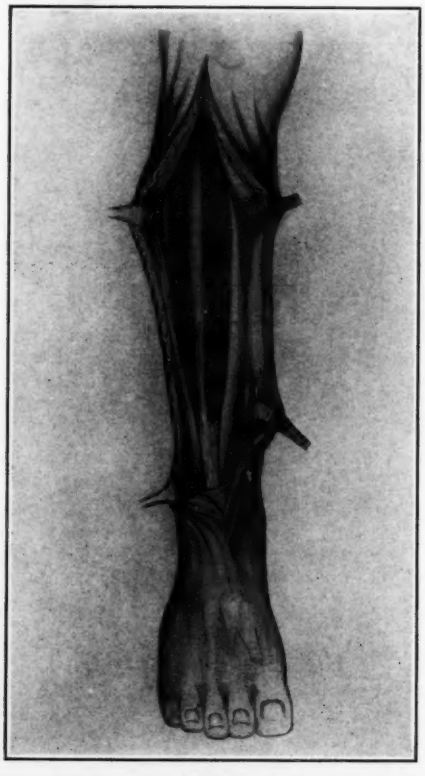

Fig. 15

Muscle grade, fair minus. This is a good muscle except for a streak of greyish degeneration running up its center from the tendon. A powerful contraction of this muscle cannot pull on the tendon effectively because of the stretching quality of the greyish streak.

Another interesting thought here is that the nerve of supply to the deltoid enters the muscle posteriorly and runs forward on the inferior surface of the muscle supplying it as it goes. The posterior fibers in this patient were strong, they would contract; they were elastic and appeared to be fairly good muscle. The anterior fibers looked and tested as if they were just as good as the back ones, although separated by the zone of fibro-fatty degeneration, and the same nerve supplied all three areas.

Is then the middle zone of degeneration caused by anterior horn cell injury? Or is it caused by the gravity-induced stretch tear, acting on a weakened muscle in its early stage of recovery when it had, perhaps temporarily, lost some of its *vis a tergo,* or is the muscle so weakened by a prolonged period of immobilization that it has atrophied from disuse and easily succumbs to the gravitational stretch tear?

Fig. 15 shows a tibialis anterior that graded fair minus. The muscle belly appeared to be very good throughout. It was elastic, it would contract; and although not absolutely normal in color and general appearance, it seemed to be a belly strong enough to make some movement in the foot if its full contraction power could be utilized. It is easily seen in the drawing why the contraction of the muscle belly cannot be effectively utilized. A zone of greyish fatty degeneration about one-half inch wide runs upward from the musculo-tendinous junction through the muscle so that a contraction of this belly pulls futilely on the tendon through the loose fatty zone.

Why could not this thin narrow zone of fatty change be dissected out and the tendon planted deeper into the muscle that remains, with some expectation that an improvement in strength would occur?

A probable explanation for this streak of degeneration running upward through the muscle from the tendon is that it is a stretch tear along the immediate linear zone of stress above the tendon. This muscle was weakened by the disease or by disuse atrophy and an equinus developed. The gravitational pull of the front part of the foot on the tibialis anterior tendon was transmitted back up to the muscle belly, which was not then elastic, and it simply gave way,

with a stretch tear above the tendon and in those fibers of the muscle to which the tendon immediately attached. The result was this degenerated streak running up the length of the muscle on its anterior surface.

This rather brief discussion of the gross pathologic features of certain muscles in type three of the proposed classification has shown that the possibility exists of improving the strength of a muscle by an operative attack on the individual muscle itself.

Naturally the type of surgical procedure will depend upon the existing pathologic condition and cannot be definitely standardized for muscles of this classification.

The muscles of type two, the muscle replacement change, in all probability cannot be improved. There is simply not enough muscle tissue left.

The muscles of type one can be improved for the most part by a new operation designated as the muscle sliding operation.

Time and space will not permit a complete discussion of the theory, technic and results in the cases that have been operated upon by this method. Fifty per cent of the few cases, however, that have been operated upon by this new procedure have shown an appreciable gain in strength of the muscle operated upon.

It seems quite reasonable, therefore, to assume that the pathology of the muscles in infantile paralysis is a subject that is worthy of a great deal more continued and intensive study, since an accurate knowledge of the distribution of pathologic changes makes it possible to restore strength to many muscles that have reached their maximum amount of improvement by bracing and physiotherapeutic methods.

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DISCUSSION (*Abstract*)

Dr. J. Albert Key, St. Louis, Mo.—This paper gives much food for thought. All of us have seen muscles in which there were areas of loss of color with pink muscle above, and I have certainly been too dumb to pay any attention to it. I have always judged the muscle on the basis of what it would do.

Obviously, we have been missing something, because there are muscles in patients with infantile paralysis in which the loss of function is due not to the fact that the muscle is totally destroyed, but to the fact that there is a zone of muscle where the fibers are destroyed and where stretching has occurred to a point where the muscle that is left can no longer exert its power.

We must think of this in the future. We should learn more about it and study it, and we ought to be able to diagnose the cases beforehand.

For the past fifteen years, I have felt that most of the results of our physiotherapy in infantle paralysis were due to nature rather than to the physiotherapist. Most physiotherapists tend to attribute every improvement in a paralyzed extremity to their efforts rather than to allow for the natural tendency of the patient to recover.

We have been following some cases in St. Louis which had no treatment at all, and the results are bearing out our theory. In other words, once the disease has ceased to progress, once an anterior horn cell is destroyed, you can do relatively little to restore power in muscle the nerve supply of which has been destroyed or is gone.

What you can do is to prevent further loss of function and give the muscle that is left a chance to work.

In the work of Dr. Hipps it is obvious that we have been missing a method of giving the muscle that is left a chance to work. Part of the result, if not most of it, which has been obtained by physiotherapy in the past has been, I believe, the result of the long-known principle that a paralyzed muscle should be prevented from being stretched. It is obvious that if paralyzed muscle is stretched those areas in which the muscle fibers are gone will be stretched excessively and will give, to a point where the rest of the muscle cannot work effectively.

There is an individual in this audience whom I should like to ask to comment on this, namely, Warren White. He has shortened many legs and paid no attention to

the muscles. According to his statements and my observations, the muscles have accommodated themselves. I want to know why they cannot do it in these partially paralyzed muscles.

Dr. Charles E. Irwin, Warm Springs, Ga.—I believe that Dr. Hipps' work will prove to be a valuable contribution.

On first thought, I believe that these transverse zones of fibrosis are probably of traumatic origin. If we review our pathology, that is, pathology of the acute stage, we know that a great number of anterior horn cells return to function, and their representative muscle fibers later return to function, which accounts for the spontaneous recovery that always takes place regardless of whether or not the patient has any treatment.

These patients all give a history of this kind: "When I was first sick, I could move only one arm, but I have recovered use of everything except one lower extremity of one arm." They all make some spontaneous recovery.

It is entirely possible that the muscle injuries take place while some of the anterior horn cells are temporarily thrown out. This certainly bears out the belief that we are approaching more and more every day, in more conservative treatment of acute cases, with less exercise.

That may sound strange coming, as it does, from me, from Warm Springs, but our methods have changed tremendously there within the past two or three years. At the present time it is an exception rather than a rule to start treatment early in cases of poliomyelitis with underwater physiotherapy.

In deltoid cases, particularly, and cough cases, which were notoriously famous in the past for not improving under active exercise, under the new method of immobilization our results are far better. It may be that we are protecting the muscles over a longer period of time and letting the natural muscular units have a chance to function and reform before they are stretched out.

Dr. J. Warren White, Greenville, S. C.—I have never had any difficulty in having muscles take up slack, but I do not see what that has to do with this paper, particularly. It is the other way around. My muscles are shortened, and the muscles that we are talking about are muscles that have been stretched.

We have all seen, for instance, the coming back of an anterior tibial which has been apparently paralyzed for years after a heel cord lengthening is done. It shows, I think, that those muscles have the ability to come back after the years.

There is a man in the audience who might enlarge a little on this subject, who treats muscles that are continually on the stretch, Win Phelps. He is working with muscles that are on constant tone, with spastics. I have been wondering if any of those muscles have ever tired out. I certainly have never seen them do that.

Those children, of course, are completely relaxed when they are asleep, and they have a chance to come back there.

Dr. Phelps, have you ever seen a spastic with tired-out muscles, that is, muscles which have grown weak over the years?

Dr. Winthrop Phelps, Baltimore, Md.—I think the only thing you could think of in that connection would be the cases in which a Teller transplant has been done.

Dr. White.—Nelson Hadley, at first, and then Freemont Chandler reported it.

Dr. Phelps.—I should think that that probably meant that the quadriceps had been stretched out, and that in transplanting the tubercle down, you simply put it on still more of a stretch. But I do not know of any other instance which would be in point.

Dr. White.—Those muscles adjust, finally, do they not?

Dr. Phelps.—Yes.

Dr. White.—I have known a few of them that just did not hold out over the years.

Dr. Phelps.—No, they get loose in the end.

Dr. Hipps (closing).—Dr. Key, your question as to the diagnosis or how to suspect the possibility that these conditions are present in the muscles has not yet been worked out. When we began the work and first found some of these zones, I asked my physiotherapist to try to feel the entire length of the muscle with her fingers and see if she could detect these islands of degeneration or islands of good tissue. She was unable to do so.

Her findings and my operative findings did not check well enough to be satisfactory. The only way I know of to suspect it is from the size of the limb: if, in a badly paralyzed limb, the size of the limb is not commensurate with the degree of paralysis that is present.

Dr. Lowman, in New York, asked me two or three days ago, "Have you ever in any of your microscopic studies on muscles seen new muscle cells form?" I have tried very hard to find them, because one man in the literature I reviewed found what he called newly developed muscle cells. I cannot say that I have found any. I had my slides looked over by two or three competent pathologists, but they could not find any new muscle cells.

Other writers who had done microscopic work have failed almost uniformly to find new cells, so I do not think it is quite possible that new cells develop as the result of physiotherapy.

You will see hypertrophied cells, you will see a bundle over here with normal cells, and then you will see another bundle that has been hit, cells undergoing atrophy, and the cells that remain are about three times the size of normal cells. These are undergoing hypertrophy, trying to take the place of the others.

The problem of stretching is another one of the most important problems in dealing with muscles. Every muscle has a normal tension, and a maximal and a minimal physiologic tension. The minimal physiologic tension for big muscles such as the quadriceps femoris might conceivably be the rupture tension for a little muscle such as the lumbar muscles in the hand.

CONGENITAL SYPHILIS IN ONLY ONE OF TWINS*

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The concept of the occurrence of congenital syphilis in only one of twins has been presented from time to time in the literature. The older case reports, before the development of serologic tests and before adequate pediatric follow-up was considered necessary, are largely philosophical dissertations and are of no value. More recent critical observers, however, have contributed a series of 12 individual case reports of this interesting phenomena, the relevant data concerning which are summarized in *Table 1*.

All these reports probably represent true instances of congenital syphilis in only one of twins, and Cases 1, 4, 5, 7 and 9 seem completely acceptable. Cases 2 and 8, however, suffer from too brief a period of observation of the supposedly normal twin to assure that it was nonsyphilitic. In Cases 3, 6, 10, 11 and 12, the examinations were not conducted until the children were so old that, although it is unlikely, neither spontaneous cure in the supposedly normal twin nor childhood infection of the syphilitic twin can be excluded with certainty from the data presented.

Our own experience is based upon two personally observed cases of syphilis in one of newborn twins and those other cases which were found in a search of the records of the Johns Hopkins Hospital. Since four of these instances occurred in the course of 44 twin pregnancies to 40 women with syphilis, the condition is not rare. An abstract of the histories of the mothers and children follows:

REPORT OF CASES

The letters A and B with numerical suffixes are used to designate, respectively the syphilitic and nonsyphilitic child of each pair and to identify them in *Table 2*.

Case 1, B. N. (U72626).—The mother was a colored primipara, 30 years of age, who was found to have untreated latent syphilis when she was about 28 weeks pregnant. Prior to delivery she received 9 injections of arsphenamine, each 0.3 grams, and 1 injection of bismuth subsalicylate (0.2 grams). Pregnancy and labor were not unusual and delivery was spontaneous at term on November 20, 1936. The placentae were separate, weighing 680 and 670 grams, respectively, and, on gross microscopic examination, showed no evidence of syphilis.

Twin A_1, female, was the larger and more vigorous and weighed 2,740 grams. There were no clinical signs of syphilis at birth or during the neonatal period. At the age of five days the complement fixation reaction showed 8 units of syphilitic reagin, but the flocculation test was negative. She was lost from observation until January 24, 1937, when the mother came in with both twins because A_1 was not gaining weight. She weighed 3,070 grams, whereas B_1, the other twin, though smaller at birth, now weighed 4,540 grams. A_1 showed pseudoparalysis of one arm and condylomata of the genitalia. Complement-fixation titer had risen to 37 units and x-ray of the long bones showed periostitis and osteochondritis. Antisyphilitic treatment was started at once.

Twin B_1, female, weighed 2,620 grams at birth. At the age of 5 days, the physical examination showed nothing abnormal. The serologic test for syphilis then showed a titer of 8 units, identical with that of her sister. However, she was not treated and at 2 months of age the titer had decreased to 1 unit. In contrast to her sister, the child was developing rapidly and now weighed 4,540 grams. Physical examination and x-ray of the long bones gave perfectly normal results. The next week all serologic tests for syphilis gave completely negative results and continued consistently to do so until the time the child was last examined at 3½ years of age.

Case 2, B. T. (U27856).—The mother was a 19-year-old colored primipara who was known to have had syphilis for several years. During this pregnancy she received only 3 injections of neoarsphenamine, each 0.45 grams, and 1 of bismuth subsalicylate (0.2 grams). Labor was spontaneous at term on November 6, 1929. The fused placentae, double ovum in type, weighed 1,030 grams and showed no syphilitic lesions. The complement-fixation test with cord blood was doubtful.

Twin A_2, male, was the first born. He weighed 1,900 grams at birth and appeared normal in every way. When two months of age he was returned to the pediatric clinic because of fretfulness. The weight then had increased to 3,225 grams. He was well developed and well nourished. There was desquamation of the skin over the thighs and a story that during the fortnight before he had "peeled all over." Generalized lymphadenopathy was found. No typical skin eruption was present at this time and the complement-fixation serologic test for syphilis was anticomplementary on two occasions. Before the clinical diagnosis of syphilis became definite he died of lobar pneumonia. At autopsy, in addition to pneumonia, extensive evidence of congenital syphilis was found in the liver, spleen, kidney and bones.

Twin B_2, male, weighed 2,480 grams at birth. During the neonatal period, x-ray examinations were normal, but there is no record of a neonatal blood test having been done. He was not further followed until

*Read in Section on Pediatrics, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

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ABSTRACT OF CASE REPORTS IN THE LITERATURE

Author	Date Reported	Type Maternal Syphilis	Age of Twins at Time of Observation	Evidence of Syphilis in Syphilitic Twin			Proof of Normalcy in Nonsyphilitic Twin		Period of Follow-up of Child
				S.T.S.(2)	Physical Examination	Autopsy	S.T.S.(2)	Physical Examination	
Martin[1]	1908	Secondary during gestation	Birth	+	Not described	Evidences present	0	Normal	4 mos.
Rietschel[2]	1909	N.D.(1)	Birth	+	Negative at birth, third week rash	.	0	Normal	5 wks.
Van der Bogert[3]	1916	N.D.	7 yrs.	+	Mongolism, enl. liver and spleen, dwarfed stature	.	0	Normal	0
Singer[4]	1919	Latent	6 wks.	+	Rash, snuffles, pharyngitis	.	0 Even after provocative	Normal	2 yrs.
Fischl and Steinert[5]	1921	Early latent	1 wk.	+	Manifest syphilitic symptoms	.	0	Normal	several mos.
Dennie[6]	1924	Latent	5 yrs.	+	Interstitial keratitis, saddle nose, residium spastic paralysis of left arm and leg, smaller stature	.	0	Normal	0
Haslund[7]	1924	Latent	3½ mos.	+	Lesions of face, ulceration lips, markedly undernourished	Liver, anemia	0	Normal	9 mos.
Cassel[8]	1925	N.D.	8 wks.	+	Not given	.	0	Not given	0
Castorina[9]	1926	N.D.	20 mos.	+	General malnutrition and retarded development	.	0	Normal	0
McKendree[10]	1937	Latent	13 yrs.	+	Juvenile paresis, teeth	.	0	Normal	0
Penrose[11]	1937	Latent	11 yrs.	+	Mentally defective, teeth. Treated for syphilis elsewhere at 2 years of age	.	0	Excellent physical development, but showed some mental deficiency	0
Wile and Welton[12]	1938	N.D.	18 yrs.	+	Anthropological measurements, neurosyphilis, mental retardation	.	0	Normal	N.D.

(1) N.D., no data
(2) S.T.S., serologic test for syphilis.

Table 1

after this brother's death, but at that time he was thoroughly studied and found to be normal. He was then lost sight of for several years, but a complete resurvey of his situation (excepting only an examination of the spinal fluid), conducted when he was 9 years old, revealed no clinical or serologic evidence of congenital syphilis.

Case 3, G. McD. (U43974).—The mother was a white multipara, 27 years of age, whose only previous pregnancy had resulted in living twins, both of whom died at about 3 months of age of diseases said to have been respectively pneumonia and retropharyngeal abscess. No further information concerning these twins was available. She had had no antisyphilitic treatment at any time and syphilis was not suspected.

Her labor and delivery on June 30, 1932, were without event. The double ovum placenta contained numerous infarcts, but there was no definite pathologic evidence of syphilis. The complement-fixation reaction of the cord blood was anticomplementary. It was not until one of the twins was definitely recognized as having congenital syphilis that the mother herself was proven to be syphilitic.

Twin A_3 weighed 2,110 grams at his birth and was a small, weak, but active baby. At the age of 10 days he had mild anemia and jaundice, but no clinical evidence of congenital syphilis. At 2½ months of age, he returned with classical signs of congenital syphilis: pseudoparalysis, desquamation of the soles, undernutrition and anemia. Roentgenograms of the long bones showed periostitis; and serologic tests for syphilis gave positive results.

The twin B_3 weighed 2,660 grams at birth and was described as "being in good condition with no signs of syphilis." Like his brother, he developed jaundice of the newborn. At the age of 4 weeks, serologic tests upon his blood gave a positive complement-fixation, but negative flocculation results. Two weeks later, at the time that his brother had classical signs of congenital syphilis, the serologic tests gave entirely negative results and roentgenograms of the long bones were likewise negative. He was carefully followed during the next year without developing any clinical or serologic manifestations of syphilis; and examinations at the age of 8 years failed to reveal clinical or serologic evidence of this disease.

Case 4, G. C. B. (U14708).—The mother was a negro multipara, 39 years of age, with late latent syphilis. The first pregnancy, five years previously, terminated in a stillbirth; the second, in a child with congenital syphilis. The mother received 3 doses of arsphenamine, each 0.3 grams, during the pregnancy now under consideration. Pregnancy and labor, on December 10, 1932, were without incident. The placenta weighed 1,100 grams, was double ovum in type and showed no syphilitic lesions. The maternal blood showed a positive serologic test for syphilis at the time of delivery, but the cord blood was negative.

Twin A_4 weighed 2,850 grams at birth and no physical abnormalities were noted at 5 months of age. However, roentgenograms of the long bones showed osteochondritis; several blood serologic tests taken over the span of a fortnight all gave positive results; and treat-

Fig. 1

A_1 B_1

Photograph of twins A_1 and B_1 at eight months of age.

Fig. 2

A_3 B_3

Photograph of twins A_3 and B_3 at five months of age.

ment for congenital syphilis was begun when she was 6 months of age.

The twin B_4 weighed 2,800 grams at birth. Roentgenograms of the bones at 5 months were all normal. Serologic tests of the blood for syphilis were negative at 2, 4, 6 and 9 months. He died September 21, 1923, shortly after an operation for verified brain tumor. Necropsy was not performed.

The pertinent data regarding these twins are summarized in *Table 2*. *Figs. 1* and *2* show the contrasting appearances of the first and third sets at the stated ages.

In addition to these, the records of a fifth set of twins, brother and sister, one of whom had syphilis and the other apparently did not, have been made available to us through our associate, Dr. J. E. Moore. The man at 27 years of age was quite normal on physical examination and his blood had repeatedly given negative reactions to serologic tests for syphilis. The woman gave a history of interstitial keratitis and Clutton's joints at 13 years of age and had developed recognizable eighth nerve deafness by the time she was 20, which progressed in spite of antisyphilitic treatment. When she was seen at the age of 27 years, she had enlarged parietal bossae and an Olympian brow; the scars of old interstitial keratitis; malformed but not typically Hutchinson teeth; and her blood gave positive reactions to serologic tests for syphilis.

DISCUSSION

In reviewing the published reports and our own experience, it seems obvious that the diagnosis of so paradoxical a phenomenon as the occurrence of congenital syphilis in only one of twins could be accepted only if:

(1) The congenital nature of the infection in the syphilitic twin be clearly proven; and

(2) The fact be established beyond peradventure that the apparently nonsyphilitic twin neither has had syphilis in the past nor is in the process of developing the disease.

The satisfaction of the first of these requirements is easy in the newborn infant, but becomes more difficult in the older child. It is possible in the adult only when classical stigmata of the congenital infection are present. In the absence of such stigmata, the possibility of syphilis acquired in childhood must always be considered.

The situation is similar in considering the apparently nonsyphilitic twin. If the infant is seen shortly after birth, adequate follow-up is necessary to establish that he is not developing syphilis; if he is first seen in later life, there is al-

SUMMARY OF DATA OF MOTHERS AND TWINS

Identification	Data of Mother: Race and Age	Type of Syphilis	Antepartum Treatments	S.T.S.(1)	Placenta	Data of Twins: Twin	Cord S.T.S.(1)	Neonatal Studies: Weight in Gms.	Blood S.T.S.(1)	P.E.	X-Ray	2-6 Weeks: S.T.S.(1)	P.E.	X-Ray
B.N.	B 30	Late Latent	10	+	Double ovum, normal	A_1	N.D. (lost)	2740	8(2)	0	0	.	.	.
U72626						B_1		2620	8	0	0	.	.	.
B.T.	B	Late	4	+	Double ovum	A_2	0	1900	.	0	0	Anti-compl.	+	+
U27856	19	Latent				B_2	+	2480	.	0	0	.	.	.
G.McD.	W	Late	0	+	Double ovum, infarcts.	A_3	Anti-compl.	2110	+	+	0	.	.	.
U43974	27	Latent			No evidence of syphilis	B_3		2660	+	0	0	0	0	.
G.C.	B	Late	3	+	Double ovum,	A_4	0	2850	.	0	0	.	0	.
U14708	39	Latent			normal	B_4	0	2800	.	0	0	.	0	.

(1) Serologic test for syphilis. (2) Units of reagin. (3) Congenital syphilis.

Table 2

(1) Serologic test for syphilis. (2) Units of reagin. (3) Congenital syphilis.

Table 2 (Concluded)

Data of Twins										
Three Months or Less			Three to Six Months			Seven to 12 Months				
S.T.S.(1)	P.E.		S.T.S.(1)	P.E.		S.T.S.(1)	P.E.	Age of Diagnosis of C.S.(3)	Length of Follow-up in Months	Condition
37(2)	+, incl. x-ray	Treated for C.S.(3)			Treated for C.S.(3)			8 wks.	20	Died miliary tbc.
1	0, incl. x-ray	0		0	0		0	—	36	Normal
.	Autopsy; extensive lesions of C.S.(3)	.		.	.		.	3 mos.	3	Died; autopsy
0	0	0		0	.		.	—	108	Normal boy at age of 9
+	+, incl. x-ray	Treated for C.S.(3)			Treated for C.S.(3)			3 mos.	96	Excellent
0	0, incl. x-ray	0		0	0		0	—	96	Normal
.	.	+	+, incl. x-ray		Treated for C.S.(3)			6 mos.	35	Excellent
.	0	0	0, incl. x-ray		Died after operation for brain tumor			—	9	Died; no evidence of syphilis

ways the possibility, even though remote, of congenital infection with spontaneous cure before the examinations were conducted.

Beyond the fact that all of our cases were double ovum twins, examination of our available information and that from the literature gives no clue as to the mechanism of production of this phenomenon. Many theories have been advanced, but none is completely in keeping with the observed facts. Dennie,[6] in discussing his case, remarks:

> "We have no theories as to why this happened, but simply offer it as a fact."

Fischl and Steinert[5] offer their own case and a general discussion of other cases as a suggestion of the paternal transmission of infection.

It may be conjectured that a few spirochetes were circulating in the maternal blood and that one or few entered only one placenta, in the case of dizygotic or only one part of the placenta in monozygotic twins; that some unknown mechanism prevented the absorption by one fetus of antisyphilitic drugs given antenatally;[13] that there was a "protective substance" in the normal twin not present in the diseased one; but all these are unproven hypotheses.

The operation of sheer chance probably provides the best explanation. The fetus of a woman with syphilis, it is thought, becomes infected *in utero* by the transplacental transmission of the infecting organism from the maternal-fetal circulation. It is postulated on good evidence that this transmission depends on the development of syphilitic inflammation in the placenta, so strategically placed that, as it extends, it breaks through the normal barrier between the fetal and the maternal circulations, with consequent escape of spirochetes into the former. Regardless of other controlling factors, in many instances chance alone seems to determine whether this does or does not occur during the pregnancies of many women with syphilis, so that such women may give birth to a succession of normal and syphilitic children arranged in any sequence.

It is not difficult, therefore, to accept the concept that the intra-uterine transmission of syphilis to only one of dizygotic twins is a matter of chance, conditioned, perhaps, by the same factors in the relationships of the maternal, placental and fetal circulations which operate in general.

Consideration of the more fanciful hypotheses such as the existence of differences in immunity

between the two fetuses seems unnecessary. Let this and similar speculations await the highly improbable occurrence of congenital syphilis in only one of single ovum twins.

SUMMARY AND CONCLUSIONS

(1) There are 12 previously reported cases of congenital syphilis occurring in only one of twins. Of these, five are completely acceptable; the others, while probably authentic, suffer from lack of documentation of important detail.

(2) The criteria are presented which must be fulfilled before the diagnosis of congenital syphilis in only one of twins may be made.

(3) Our own observations concerning five instances of congenital syphilis in only one of twins are presented.

(4) It is emphasized that since four of the five instances of this phenomenon were observed in 44 twin pregnancies to 40 women with syphilis, the condition is not so rare as might be expected.

(5) The twins in this series were all dizygotic. Apart from this fact, which we think to be of crucial importance, we have only hypotheses to advance to explain the anomalous escape of one twin while the other was infected with syphilis *in utero*.

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DISCUSSION (*Abstract*)

Dr. Philip F. Barbour, Louisville, Ky.—Dr. Smith has certainly had a very unique experience in that he has observed five cases of syphilis in one of twins when there have been reported only fourteen cases. We must assume that the fetus acquires syphilis through a local implantation of the spirochetes in the placenta and a breaking through the placental wall at that point. Of course, there are many syphilis-free children born of syphilitic mothers. There may be numerous spirochetes in the mother, but the placenta may not have been involved. If it is a monozygotic infection, it would be possible though actually highly improbable that the spirochetes would get into the umbilical vein of only one child. The possibility of an infection through trauma at birth must be considered, but it certainly must be rare. I have never known of a general practitioner or an obstetrician who contracted syphilis from delivery of a syphilitic mother, and my memory runs back to the days when rubber gloves were not even dreamed of.

There seems to be a certain time in the syphilitic infant's life when it is Wassermann negative, for possibly several months. In conversation, Dr. Kahn told me that he rather doubted this statement, but our clinical laboratories here are manned by thoroughly capable men and I know they have had this experience. One cannot wholly disregard clinical findings.

The cases reported by Dr. Smith have been under observation a sufficient time to have eliminated this possible source of error.

Dr. Smith (closing).—I feel that besides the fact that we have collected five cases from the records of the Johns Hopkins Hospital, not my own practice, by the way, the subject is interesting not only for itself, but also because if we can solve this problem I think we can do something toward the solution of the method of transmission of syphilis to the fetus. There are several pitfalls in diagnosis and one of the reasons there are only twelve cases in the literature is that it is difficult at times to be sure that the twins are monozygotic or dizygotic. Penrose reports his as occurring in monovular twins, but the basis of this diagnosis is entirely by finger prints.

I have found another instance of mistaken diagnosis. Dennie and Pakula have just published a most interesting book on congenital syphilis. It came out only about two weeks ago and there was not a copy in Baltimore. However, I got hold of one just long enough to see that they have a complete chapter devoted to congenital syphilis in twins. Dennie explains thoroughly how in one set of twins he thought for a long time that one was syphilitic and one was nonsyphilitic, but that after a course of treatment which he gave to the nonsyphilitic twin, and he did not explain why he gave it, serological tests of the twin that he had reported as negative became positive. This change he considers a reaction of the provocative Wassermann type.

We are also presented with another difficulty which is that it has never been found possible to produce congenital syphilis in experimental animals comparable to the type of infection that occurs in humans. Kemp, in Chicago, I think did succeed, but only by killing both the mother and the unborn animals.

FAT NECROSIS STUDIES, IV: OBSERVATIONS ON PEANUT FATTENED HOGS*

By M. Pinson Neal, M.D.†
Columbia, Missouri

Fat Necrosis in Soy Bean Fattened Cattle and Rabbits.—Horvath and Chang[1] reported that prolonged feeding and overconsumption by rabbits of raw soy beans which were rich in lipase produced a rise in blood serum lipase, and on killing these animals they discovered in the perirenal fat a necrosis which, from their description, was fat necrosis. Autoclaved or cooked soy beans which had lost their lipase, according to the ethyl butyrate test, fed to like animals and in similar quantities, gave no such results, thus showing that the activating substance was destroyed by heat. Horvath[2] noted similar necrotic areas in the perirenal fat, and sometimes in the subpleural fat of beef cattle in northern China that had been fed heavily on soy bean cake and black soy beans (observed in the slaughter house in Tsingtau, China). In both instances the lesions were interpreted as fat necrosis, and the fact that rabbits fed on cooked soy beans did not show the necrosis was very suggestive of an enzyme as the cause. Horvath[2] did not observe the condition in Mongolian cattle fattened on grass (examined in Tientsin). The observations of these authors at least show that a disturbance in the lipase balance and this change which they interpreted as fat necrosis may occur simultaneously.

Lipase as a Cause of Fat Necrosis.—Neal and Ellis[3 4 5] have found and recorded in previous studies that products obtained from both animal and vegetable sources, and presumably containing lipase in a pure form, were potent to produce experimental fat necrosis. Through a series of extractions, they obtained this lipase substance from fresh hog's pancreas, fresh hog's liver, commercial pancreatins, the seeds of Virginia grown peanuts, *Arachis hypogaea* (Hispanus), the sunflower, *Helianthus annuus,* the common castor bean, *Ricinis communis,* and the Chinese soy bean, *Glycine hispida.* It is well recognized that many plant seeds are rich in oils and the presence of lipase in these oil-bearing seeds has often been demonstrated. This fat necrosis-producing substance answers all the physical, chemical and enzyme reactions for lipase and lipase alone. That which was obtained from vegetable seed sources certainly did not contain digestive enzymes, as trypsin, which theoretically at least might be present in extractives from animal sources.

Using the lipase fractions from both vegetable seed and animal tissue sources, they have experimentally produced characteristic fat necrosis by gross and histologic interpretations in white rats, *Mus decumanus;* dogs, *Canis familiaris;* cats, *Felis domestica;* turtles, *Macroclamys pseudographica,* the geographic turtle; and *Chrysmes belli cinerea,* Bell's painted turtle; fish, *Lepisosteus platystomus,* the short nosed gar; and *Cyprinus carpio,* the German carp; chickens, *Gallina domestica;* and pigeons, *Columba livia.* Lesions were observed at periods of time varying from 6 hours to 17 days following intraperitoneal injections. Autopsies on their 625 animals revealed fat necrosis to be most common in the perirenal and peritesticular fat deposits. This is in conformity with the observations of Horvath on the carcasses of soy bean fattened cattle.

Soft Pork.—Various of the state experiment stations, the U. S. Department of Agriculture, Bureau of Animal Industry, and several of the private packing companies have carried on extensive studies dealing with soft pork and oily hogs, as to cause, prevention, modification, or eradication (*Fig. 1*).

Feed, being the source of body fat, is the outstanding factor in the causation of soft pork.

"Feed fats in general are deposited in the body in the form closely resembling the original. When high fat feeds, such as peanuts and soy beans, make up the principal part of the ration the feed fat is sufficient to account for most of the body fat. With feeds which contain a smaller percentage of fat, the body fat may be synthesized to a larger extent from carbohydrates and proteins. Such fat is materially harder than that produced from peanuts, soy beans and similar feeds. The smaller the proportion of feed fat (softening in character) to carbohydrates, and proteins entering into fat deposition, the firmer is the body fat stored."[6]

"Peanuts, which contain 45 per cent oil, are one important cause of soft pork in certain sections. With large gains on peanuts, there is a tendency for the carcasses to become oily as well as soft."[7]

Peanuts, when grazed or self-fed for 60 days to pigs, starting at approximately 100 pounds in weight, produce soft carcasses.[8]

It has been definitely accepted that softening

*Read in Section on Pathology, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

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of pork, with its oiliness of fat, is caused by a number of foods, all rich in fat, and some have been proven to be rich sources for lipase. While soy beans were early recognized as an outstanding cause of meat softening when fed to hogs, it is now accepted that peanuts, rice bran, velvet beans, and distillery slop exert the same action. Generally speaking, where these foods have been cooked and then fed to hogs, the degree of softness of the finished product is much less.[9] This indicates either some change in the food fats by heat, modifying their type or form for deposit within the animal's body, or a destruction of some substance, possibly the enzyme lipase.

Soft pork is an entirely different condition and of different interpretation and consequence from fat necrosis. There are some similarities in causation and in the control or prevention. It is discussed here because of those similarities. Inquiries have been addressed to several of the large packing plants that handle soft pork and to the U. S. Department of Agriculture, Bureau of Animal Industry,[10] concerning observations their workers might have made on fat necrosis. They have brought, without exception, extensive reports on the problem of soft pork, and further have uniformly stated that they had not had occasion to study adipose tissue from the standpoint of gross or histologic change. A critical summation of the publications by the Conference on Cooperative Meat Investigations by the State Agricultural Experiment Stations, the U. S. Department of Agriculture and the Livestock and Meat Industry, Participating, published in 1937[11] as a Report of the Review Committee, yields no reference to fat necrosis or of its having been observed in these extensive studies and experiments.

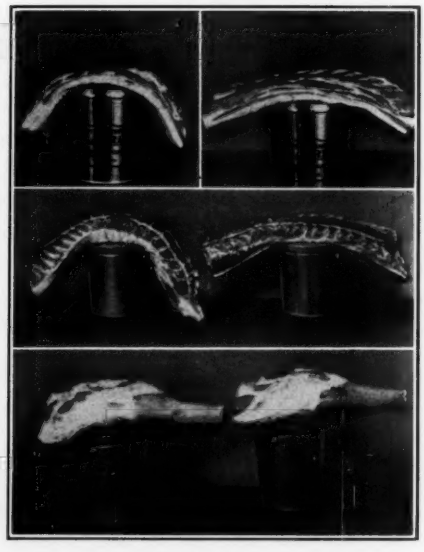

Fig. 1

Bellies, loins and hams from typical soft pork, compared with cuts from firm hogs. (Courtesy of Agricultural Experiment Station, University of Illinois.)

STUDIES ON THE SPONTANEOUS PRODUCTION OF FAT NECROSIS AMONG PEANUT FATTENED SWINE, *SUS DOMESTICA*

Neal and Ellis[3] have conclusively shown that peanuts are rich in lipase content and that extractives known to contain this substance in pure form or even in crude radicals are capable of producing fat necrosis. Inasmuch as enormous numbers of hogs are being fattened on peanuts over a rather large geographical area of certain of our Southern states, it has been held by the author that observations on several thousand carcasses of such fattened hogs would prove of interest and value in this work. Pursuant to that desire, during the period of December 18 to 23, inclusive, 1939, when animals fattened in this manner were being slaughtered in some of the southern Georgia packing plants, it was possible to carry on the studies involving a total of 8,324 hogs. The problem necessitated the inspection of all animals being slaughtered during a day's run, and there was an average daily kill of over 1,400.

Age and Weight.—The hogs varied in live weight from 60 to 600 pounds, the general average being between 150 and 200 pounds. In ages there were small numbers of 5 to 6 months, and a few of 2½ to 3 years, but predominantly they were of from 7 to 10 months of age.

Feeding.—The study was carried out at the height of the seasonal peanut fattening period on animals that were self-fed, pastured or grazed on mature peanuts in the field, in some instances from which a portion of the crop had been harvested for commercial purposes. Most of the peanuts were of the small Virginia type, though some were of the large Spanish variety. It was impossible to determine the length of time that an individual hog might have been on this type of feed, but it varied from 2 or 3 weeks to 4 months. The animals were almost invariably slaughtered and then inspected within from 48

to 72 hours after being taken from the farm and their place of feeding.

Examination.—After the process of scalding at a temperature of 138 to 142° F. for about 3 minutes, and the hair removed, the carcasses arrived at my station cleaned, the thorax and abdomen opened, and body divided, with a center split including a mid-line cut through the backbone. A small area near the rear or rump end and the undivided head were holding the halves together. The organs from the chest and abdomen had been removed, including stomach, pancreas, liver, intestinal tract, the mesentery, a portion of the diaphragm, and in almost all instances, both kidneys. Rarely were one or both kidneys *in situ.* With the carcass in this condition and hanging from a hook, head down, in transit on a moving chain, it was easy to visualize thoroughly the fat deposits in the: (1) thoracic and abdominal wall, both ventral and dorsal, as revealed along the edges marginal to the cuts made for dividing the body; (2) around the kidney beds from which these organs had been removed, or when *in situ,* following blunt finger dissection, shelling them away from the perirenal bed of fat; (3) that behind the peritoneal surface and lateral to the spine from the diaphragm to the pelvis; (4) that which is reflected on to the diaphragm from its marginal attachments, left and right; (5) an elongated strip within the thorax lateral to the sternal margin; (6) layer on the parietal pleural surfaces, often very heavy in the intercostal spaces; and (7) an area about the pelvic brim.

To this extensive study of the fat deposits, on one day, was added the pancreas and its immediate surrounding fat. This was made possible through having the organ from the entire number of hogs, namely: 1,011, killed on that date saved in large containers. They were then in deliberation examined after the day's kill was completed. This was found impossible on the other days because time and energy were entirely utilized in the inspection of the carcasses on the conveyor chain after the pancreas had been removed.

All areas that were suggestive of fat necrosis were removed and immediately fixed in formalin for later histologic study.

PANCREATIC FINDINGS

Gross.—Of the 1,011 pancreases inspected, one bore on its surface and in the surrounding fat, areas of typical fat necrosis, chalky white, of from 1 to 3 millimeter size, and hemispherical in shape. A second pancreas had embedded in its substance several 3 millimeter nodules somewhat like fat necrosis, but upon incision of one, there was found a tiny parasite. These were then interpreted as parasitic cysts. A third pancreas that was swollen, tense and hemorrhagic contained many foci of typical fat necrosis, of from 1 to 4 millimeter size. Some were larger, more irregular in shape, as if several smaller units had merged. In the pancreatic duct were found several parasites that were identified as the kidney worm. Marginal to a fourth pancreas within the lumen of a rather large blood vessel, a branch of the portal vein, were several kidney worms (parasitic emboli) (*Fig. 2*).

From this study of the pancreas, its adherent fat, and its blood vessels, then were found three specimens harboring the kidney worm. In one instance there were multiple parasitic cysts. In a second, the parasites were in the pancreatic duct, and unquestionably contributed to the associated acute hemorrhagic pancreatitis and fat necrosis. In a third, the same type of parasite was found in a vascular channel, but without evidence of such necrosis.

Histologic.—The sections from the three pancreases that showed gross lesions in every respect confirmed the anatomic interpretation. One had multiple areas of typical fat necrosis as well as parasitic cysts, with thin, fibrous capsules between lobules of the pancreas. The second revealed only parasitic cysts, while the third showed numerous areas of typical fat necrosis within the substance of the gland and in the attached fat around the capsule. This organ showed a very extreme degree of acute hemor-

Fig. 2
Parasitic emboli, *Stephanurus dentatus,* in branches of portal veins of hogs.

rhagic inflammation with areas of coagulation, as well as fat necrosis.

In the two instances where the pancreas revealed characteristic gross and histologic fat necrosis there was an associated damage of the pancreas, one of which was definitely parasitic in character. This then led to the interpretation that the fat necrosis was due to pancreatic damage, and not to some other element.

FINDINGS IN FAT DEPOSITS

Gross.—Because of the finding of the kidney worm in these animals, with its presence in the perirenal fat, often within small cysts, many specimens were saved for microscopic section that would not ordinarily be necessary in animals not so infested with parasites. Among the 8,324 carcasses examined, there were 3 instances in which lesions taken to be fat necrosis were found. The differentiation between these and the many small parasitic cysts that were seen was based on the gross appearance, shape, consistency, color, and size. The fat necrosis areas were more of a hemispherical shape, dry, chalk-like, firm, white, and of 2 to 3 millimeter size. The cysts were more spherical, moist, tan to brown or yellowish in color, generally more than 3 millimeters in size, and upon incision, frequently yielded a fluid exudate and small parasites.

Histologic.—The many sections taken from fat deposits showing lesions that were questionable as being fat necrosis showed these to be inflammatory foci, or parasitic cysts, with the exception of three. All of these were in perirenal fat, and showed characteristic tissue changes and staining reaction for fat necrosis. In the areas involved the fat cells were much swollen, appeared run together, with the outline of many appearing more like shadows or ghosts, and the cytoplasmic portion composed of a translucent, homogeneous, acidophilic staining material. The nuclei were entirely gone, evidently by lysis, since no nuclear fragments could be found. Surrounding these areas of necrosis there were moderate degrees of reactive cell infiltrations, forming a thin line of demarcation (*Fig. 3*).

THE PRESENCE OF AND REACTION TO PARASITES

The Bureau of Animal Industry has long recognized that hogs self-fed by pasturing on contaminated areas, or fed in polluted lots, may show parasitic infestation, and has spent much energy and time in efforts to prevent the loss which the packers have in handling such animals. Diseased organs, as liver, pancreas, and kidney, are routinely removed from such carcasses and used for tankage only. In the inspection of these 8,324 hogs, some showed the presence of a parasite, the *Stephanurus dentatus,* commonly known as the kidney worm of swine. These were found within the liver, the pancreas, in pancreatic ducts, and in blood vessels, but in greatest numbers in the kidneys (*Fig. 4*), or the tissues immediately around this paired organ. In some cases these were found within small inflammatory foci of about 6 millimeter size, and in other in-

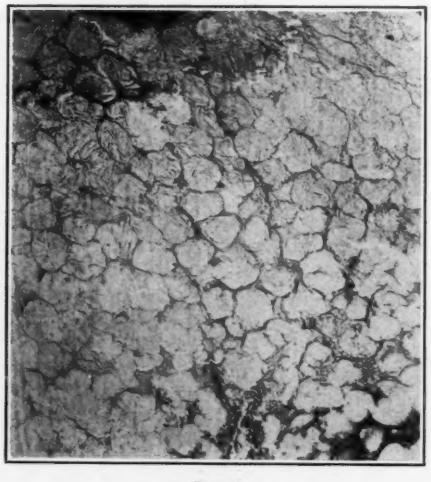

Fig. 3
Area of perirenal fat necrosis: X98.

Fig. 4
Parasitic inflammatory foci in kidney closely resembling fat necrosis.

Fig. 5
Stephanurus dentatus, kidney worm of swine.

stances in larger areas, as cysts, having thin, fibrous capsules surrounding central zones of necrosis that contained one to many of the parasites. In a few instances a series of these would parallel the ureter from the kidney to the bladder. While the adult worm measures up to 45 millimeters in length and from 1 to 2 millimeters in diameter, larval forms of 10 to 15 millimeter length were found in some of the lesions (*Fig. 5*).

The life cycle of this parasite is given[12] as follows:

"The infective larvae enter their host by being ingested or they actively penetrate through injured areas in the skin. * * * They reach the liver through the systemic circulation. They penetrate the hepatic tissue and finally work their way through the liver capsule into the peritoneal cavity, from where they wander further until the larvae come in contact with the perirenal fat. In the course of their wandering they invade the lungs, spleen, liver, pancreas, and other abdominal organs in which they frequently go astray * * *. In the uterus and pelvis of the kidneys the larvae attain fertile maturity and lay eggs which are voided with the urine."

Small lesions, those of 3 to 4 millimeter size, produced by the presence of these parasites or their ova, were found to be easily confused, on gross inspection, with fat necrosis. As previously stated, the size, shape, color, consistency, and degree of moisture, were used in differentiation. The fact that parasites could be found in some, especially those of larger size, as cysts, made these more easily recognized. In the case of smaller and questionable foci, the microscopic findings were used for final interpretation. These uniformly revealed a thin, fibrous capsule surrounding a central area of necrosis, containing reactive cells, largely lymphocytes, with some eosinophils common, and the presence of either the parasite or many of the parasitic ova (*Fig. 6*).

CONCLUSIONS

(1) A study by gross and histopathology of selected foci from the carcasses of 8,324 peanut fattened hogs revealed a uniform softness of the meat and the presence of the kidney worm, *Stephanurus dentatus*, only three instances of perirenal fat necrosis, and two of pancreatic fat necrosis.

(2) The presence of the *Stephanurus dentatus* in the pancreas or pancreatic duct was considered the cause of the pancreatic fat necrosis.

(3) Under the conditions of fattening, marketing and slaughtering of hogs here met, fat necrosis is not produced by the feeding of the lipase-containing peanut.

(4) The gross fat necrosis, reported by Horvath and Chang,[1] and by Horvath,[2] and soft pork are produced by the same food, untreated vegetable seeds, all rich in fat and containing

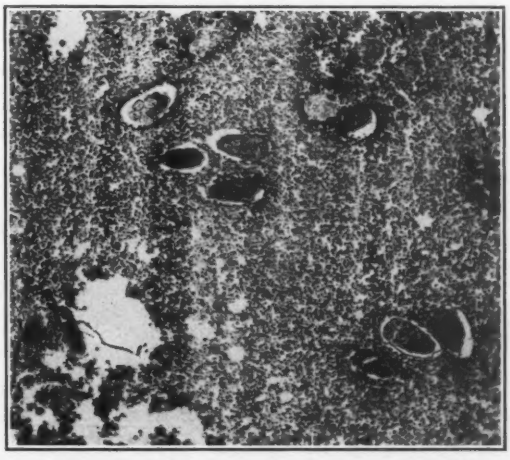

Fig. 6
Inflammatory focus containing ova of the *Stephanurus dentatus* within exudate: X134.

lipase, and both conditions are apparently prevented by cooking such food elements.

(5) Interpretations of fat necrosis not based on histologic studies to eliminate parasitic and other inflammatory foci are not dependable.

ACKNOWLEDGMENT

Thanks are again here proffered to the officials of those packing firms of southern Georgia who extended the courtesies and privileges of their respective plants, and to the members of the inspection groups of the Bureau of Animal Industry, U.S.D.A., stationed at those plants, for their courtesies and aid. Without this cooperation and consideration this study could not have been carried out.

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DISCUSSION (*Abstract*)

Dr. A. J. Miller, Louisville, Ky.—It seems to me that there is very little need to doubt the conclusion that Dr. Neal has drawn, namely, that in so far as the ingestion of lipase contained in peanuts and swine is concerned, fat necrosis does not occur. I would infer that he means to tell us that evidence for lesions produced in other animals, including man, that might have been said to occur in the same way, can be discounted.

I am wondering if there is any evidence that can be relied upon to indicate that such a substance as lipase could be localized in the tissues. Of course, it would have an affinity for fatty tissue, but is there any reason why it should be present in certain locations, in the fat in certain locations in the body, for instance, possibly in the peritoneal fat or in the fat of the mesentery? If that is the case, this damage to the fat tissue should be more universal than that.

There are still to be accounted for certain reported lesions in fat tissue. Among them are lesions reported to be necrosis in the subcutaneous fat, in the peritoneal fat, in the pericardial fat, and also in the fat of the mammary gland. So far as my own experience is concerned, I cannot say that I have ever encountered such a lesion which could not be explained on some other basis, and for that reason I have discounted entirely the lipase theory of their etiology.

Such things as trauma, infection, or the injection of oils, as a vehicle for certain therapeutic agents have offered an explanation for all such lesions that I have encountered, except those that could be explained by an escape of secretion from the pancreas.

I should like to raise the question, if Dr. Neal cares to mention it in his discussion, as to his reaction in regard to these peripheral lesions, subcutaneous in the mammary gland and other places in the body, which have been reported and attributed to be the result of localization of lipase from the intestinal tract.

Dr. Harry C. Schmeisser, Memphis, Tenn.—Dr. Neal's contribution should be compared with the fat necrosis in human beings, and I shall try to do that as far as I am able.

In human beings we deal with two forms of fat necrosis. The first is spoken of as pancreatic fat necrosis, and the second is spoken of as traumatic fat necrosis. Pancreatic fat necrosis is due to the liberation from the pancreatic channels of the ferment known as lipase. Some injury to the duct of the pancreas which is carrying the pancreatic secretion to the duodenum takes place and the lipase oozes out into the pancreas and causes necrosis and saponification of the neutral fat which is broken up into glycerin and fatty acids. The glycerin is absorbed, and the fatty acid is crystallized and appears as bundles of needle-shaped crystals instead of the droplets in the fat tissue which are beautifully shown in these sections. It is not easily soluble by alcohol, as the neutral fat is, and therefore it will be readily seen under the microscope. It produces in the gross the characteristic just visible, and larger, gray, opaque, chalky area.

Now the other form of fat necrosis, known as traumatic fat necrosis, occurs subcutaneously in children. It also occurs in the mammary gland, and is a saponification in the absence of lipase. It is a slowly progressing saponification of the neutral fat, again changing into glycerin which is readily absorbed, and the fatty acid which is crystallized out in fatty acid crystals. The change under the microscope and the gross is quite similar to the first form. The second form results in an inflammatory reaction with large mononuclear phagocytic cells taking up the debris, and it needs to be differentiated from tuberculosis, syphilis, and sometimes carcinoma. It is not with that form that Dr. Neal is dealing. He is dealing with the pancreatic fat necrosis type.

Of interest is the factor of some mechanical or other injury to the duct which drains the secretions from the pancreas. Years ago, Opie found a case in which there was a stone in the ampulla of Vater which permitted the bile to pass from the common bile duct into the pancreatic duct which was supposed to be the irritant, which set the ferment free. Then Opie injected bile into the pancreatic duct of animals and got similar results. Flexner showed that gastric juice and many other irritating substances would do so, too.

Now let us consider Dr. Neal's studies. He started in 1930, and this is his fourth paper to my knowledge. He has been particularly interested in the etiologic agent of this pancreatic fat necrosis.

In today's paper, the question that comes up is whether the mechanical presence of the kidney worm, causing injury to the duct of the pancreas and allowing the pancreatic ferment to get out into the fat, is the cause, or whether it is the presence of the lipase given in a diet. He has come to the conclusion that it is the first, that it is the presence of the kidney worm that is setting free the lipase from the pancreatic juice, and that it is not lipase in the diet.

It is of interest to note that lipase in pancreatic fat necrosis has been isolated in the fat necrosis far away from the pancreas, for example, the pericardial fat, the pleural fat and the renal fat and subcutaneous fat. Lipase has also been isolated from the blood in cases of pancreatic fat necrosis, and from the urine. So there is no question that the lipase liberated from the pancreatic duct affects the fat locally, and it also gets into the circulation and causes fat necrosis at a distance.

It would seem from the spontaneous cases in cattle which Dr. Neal described that we are dealing with the lipase which comes from the pancreatic secretion as a cause of pancreatic fat necrosis, and not due to lipase which is given in the diet in these animals.

Dr. Neal (*closing*).—I think we can discount the idea that lipase in food is a cause of the fat necrosis. I cannot concede its occurrence, certainly not under the conditions under which this experiment was carried through.

Relative to fat necrosis that is occasionally seen in the mammary gland or in the subcutaneous fat of the newborn, the opinion is held that lipase either in pure form or as it occurs naturally in foods and administered orally does not become localized or deposited in such tissues and thus cause the lesion.

As to why lipase is localized in certain fat deposits as perirenal, peritesticular or pericardial in the commonly called pancreatic type of fat necrosis, one can only surmise. At least three factors are involved. First, is the type of fat. This can be determined by certain tests, namely, the iodine number and the saponification number. The fat around the kidney of the young is different from the mesenteric fat of the young, and the fat about the adrenals of the young is greatly different from the fat around the kidney of the adult. Second, one must consider the hydrogen ion concentration in one part of the body as contrasted with another. Third, the chemical constituents of the tissue where the fat is located may play a part in supplying products having a role in localization or for the action in producing fat necrosis when localization takes place.

OBSERVATIONS ON THE EFFECTIVENESS OF A YEAST-PEANUT BUTTER MIXTURE IN VITAMIN B COMPLEX DEFICIENCIES*

A PROGRESS REPORT

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Since the advent of synthetic vitamins, many persons near death from dietary deficiency diseases have been restored to health by proper use of these chemical compounds. The administration of nicotinic acid to pellagrins confined to custodial hospitals for the insane may enable them to regain their normal mental state and to return to a satisfactory life in their homes. Thiamin has brought rest and freedom from pain to patients suffering from so severe a nutritional neuritis that they could not sleep, even after taking narcotics. Riboflavin has relieved persons whose eyes hurt so badly that they could not read or endure a lighted room. These dramatic therapeutic effects are tending to overshadow the necessity of finding cheap and effective methods of prevention.

From the study of infants, children and adults with pellagra, beriberi, and riboflavin deficiency, in an endemic area, we have come to recognize that fretfulness and failure to grow in infants and children, and apprehension and general ill health in adults, may be early symptoms of deficiency diseases. Evaluation of our patients' dietaries throughout the changing seasons of the year, and application of numerous therapeutic tests have shown us that such diseases often begin in infancy and childhood, waxing and waning with the seasons of the year, infections, activity, and changes in the quality of the diet, gradually progressing until the lesions typical of these deficiencies appear. Both early and advanced symptoms of pellagra, vitamin B_1 deficiency, riboflavin deficiency, and vitamin B_6 deficiency, in the infant, child or adult, are greatly relieved following the administration of syn-

*Received for publication December 13, 1940.

*From the Department of Internal Medicine, University of Cincinnati; Department of Preventive Medicine, University of Texas Faculty of Medicine; and Department of Medicine, University of Alabama. These studies were aided by a grant from the John and Mary R. Markle Foundation.

thetic nicotinic acid, thiamin, riboflavin and pyridoxine, respectively. Nevertheless, these synthetic substances, although at times life-saving, cannot replace all of the nutritional defects in the patients' diets. For a number of years, we have been studying the therapeutic and prophylactic aspects of natural foodstuffs, keeping in mind that they are of little value to those who are poverty stricken unless they are inexpensive as well as palatable to the patient over a long period of time.

Many investigators have observed the value of yeast and liver extract in the relief of symptoms due to a deficiency of the vitamin B complex. Since many of the patients took these substances while in the hospital under our supervision and improved a great deal, we were surprised to learn that they often refused to take them for long periods of time at home. It thus became desirable to search for some widely distributed, easily stored, and generally well-liked food having the therapeutic properties of yeast or liver extract. We have tested a number of foods grown in the southern part of the United States and have found some to be satisfactory. The most promising at the moment seems to be the peanut. It is efficacious in the gradual relief of mild deficiencies due to lack of the water-soluble vitamins and, in addition, furnishes a considerable amount of energy material and protein of good quality. The results per unit of weight, however, with the peanut alone (the smaller peanuts seem better than the larger ones) have not been so good as those with a high grade of dried brewers' yeast. We then considered the desirability of fortifying peanut butter with synthetic vitamins or with yeast or liver extract. Knowing that water-soluble or fat-soluble vitamins could be blended with peanut butter and that this vehicle, according to a dietary analysis of our patients' food habits, was acceptable and pleasing, we mixed it with yeast in varying amounts. Most of our patients liked the mixture compounded up to 25 per cent yeast, for the combination of yeast and peanut butter when blended properly masks the undesirable taste of the yeast.

Dr. William deKleine, Director of the Medical Division of the American Red Cross, and representatives of Anheuser-Busch, Inc., independently from us, became interested in the possibilities offered by such a product. At a conference, Dr. deKleine and the representatives of Anheuser-Busch, Inc., stated that they had no facilities for clinical testing. Anheuser-Busch, Inc., has supplied us with a commercial peanut butter, blended either with "strain K," a residual brewers' yeast powder, or "C-50," a "special and more palatable brewers' yeast." Dr. deKleine has offered valuable suggestions at conferences from time to time. While the testing of the possible value of these mixtures as a supplement to the diets of malnourished persons in the early stages of dietary deficiency diseases will be in progress for a long time, certain data warrant publication at the present time.

Twenty-five malnourished patients with mild pellagra, beriberi or riboflavin deficiency were selected and studied in the wards of the Hillman Hospital, Birmingham, Alabama. At the time of admission to the hospital, they were underweight and had lesions diagnostic of one or more deficiency diseases. In spite of rest in bed and a proffered diet, their disease progressed. We therefore offered each patient peanut butter containing 15 per cent brewers' yeast *ad libitum b. i. d.* The "strain K" yeast was alternated daily with the "strain C-50" yeast. By the end of the first week, it became evident that the patients would continue to eat the mixture even when the yeast content was increased to as much as 25 per cent. At this level, it was found desirable to replace 8 per cent of the peanut butter with peanut oil in order to obtain a product of a better consistency. Crackers or bread were served with the mixture and it was given with the morning and evening meals. Each patient was allowed to eat *ad libitum* of the mixture, the values of which are as follows:

TABLE I

	Wt. in grams	Gms. P	Gms. F	Gms. C	Total Calories	Gms. Ca	Gms. P	Mgms. Fe	I. U. Vitamin A	I. U. Vitamin B_1	I. U. Vitamin C	Mgms. Riboflavin
Peanut Butter	67	19	31	11	399	.053	.302	1				
Peanut Oil	8		8		72							
Strain C-50 Yeast*	25	13	1	7	89					1250		1.9-2.5
Total	100	32	40	18	560	.053	.302	1		1250		1.9-2.5

*The values for "strain K" yeast are essentially the same as those for "strain C-50" yeast.

Twenty-three of the twenty-five patients ate the yeast-peanut butter mixture twice a day, but two patients refused to eat it. (These two were treated with synthetic vitamins which relieved their symptoms.) Two of the remaining twenty-three complained at times of a bitter taste of the "strain K" mixture, but in no instance was there unfavorable comment when the "C-50" yeast was used. None of the patients noticed the increase from 15 to 25 per cent yeast. The majority of these patients were observed for two months, and they consumed an average of from 60 to 75 grams of the mixture per day. A few men ate as much as 160 grams a day. In most instances, the appetite improved, the patients gained weight and felt stronger, and the symptomatic lesions began to heal slowly. Our previous studies would indicate that without this supplement, most of these patients would have become worse gradually since, in many instances, the diet offered was not eaten.

It would be misleading to compare the gradual improvement induced by the yeast-peanut butter compound in mild cases of vitamin B deficiency with the spectacular clinical remission and even life-saving effect which frequently follow the administration of large doses of nicotinic acid for pellagra, riboflavin for riboflavin deficiency, and thiamin for thiamin deficiency. It is equally fallacious to consider that these three vitamins can compensate for all the deficiencies of many American diets.

It is estimated that 50 per cent of the American people fail to have optimum health and maximum vigor because of a low intake of the vitamin B components. The mixture investigated is a very rich natural source of the water-soluble vitamins and offers one method of increasing the total vitamin consumption of the relatively large number of people who like peanut butter. Per unit weight, this compound contains as much carbohydrate as potatoes, more protein than steak, and one-half as much fat as butter; consequently, it contributes significantly to the protein and energy value of the diet. Obviously, such a supplement cannot correct all the defects in the dietaries of these persons; yet, it is a step toward increasing the intake of essential vitamins.

We find that a mixture containing 25 per cent dried brewers' yeast powder, 67 per cent peanut butter, and 8 per cent peanut oil, is an inexpensive, palatable food mixture that tends to prevent pellagra, beriberi, and riboflavin deficiency. Two ounces or more of this mixture a day, used as a supplement to the diet, gradually improves the health of the person with subclinical symptoms of deficiency diseases due to suboptimal intake of the vitamin B complex and retards or prevents recurrences of these diseases in the average malnourished person living in an area in which deficiency diseases are endemic.

SUMMARY

Twenty-three patients with mild deficiency diseases improved following the daily ingestion of a yeast-peanut butter mixture. (Our previous studies would indicate that most of these patients would gradually have become worse without this supplement since they were refusing to eat the diet offered.) Although the yeast and the peanut both contain nicotinic acid, riboflavin, and thiamin, the total effect of this supplement is not due to these vitamins alone, since per unit of weight this compound contains as much carbohydrate as potatoes, more protein than steak, and one-half as much fat as butter.

HYPOPROTHROMBINEMIA AND VITAMIN K IN NUTRITIONAL DEFICIENCY STATES*

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Vitamin K deficiency does not develop readily in mammals even though the vitamin is eliminated from the diet. In prolonged experiments with rats, however, dietary restriction does result in a severe deficiency in an occasional animal, as first shown by Greaves[1]. It has been shown also[1 2] in such experiments that vitamin K reserves can be depleted even though an actual deficiency state does not become manifest in most of the animals. A recent report[3] cites 4 human cases of nutritional deficiency in

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*Received for publication November 21, 1940.

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which moderate prolongation of Quick's prothrombin time was corrected by administration of vitamin K. Observations of this type suggest that a moderate deficiency of this vitamin might be encountered frequently in human nutritional deficiency states.

Method.—We have recently studied the plasma prothrombin level in 48 patients seen in the nutrition clinic of the Hillman Hospital, Birmingham, Alabama. These patients had clinical evidence of a deficiency of one or more of the factors of the vitamin B complex. This group was compared with a series of 37 patients from the medical service of the University of Iowa which had essentially the same age distribution of 20 to 71 years. The most common diseases in the Iowa study were diabetes mellitus and chronic arthritis. Other diseases included goiter, nephritis, peptic ulcer, Raynaud's disease, Hodgkin's disease and asthma. None of the patients selected was acutely or critically ill, and the cases in which there was clinical suggestion of disease of the biliary tract or of the liver were excluded from the series. The prothrombin determinations were made by the method of Warner, Brinkhous and Smith.[4,5] Parallel determinations were made in a number of cases by the method of Quick[6] and by the "bedside" method of Ziffren, Owen, Hoffman and Smith.[7]

Observations.—In the 48 cases showing evidence of nutritional deficiency all but six patients had prothrombin values above 80 per cent of normal and only one patient had a value below 60 per cent. Actually the incidence of definite hypoprothrombinemia is slightly greater in the series in which nutritional deficiency was not present. In this latter series, 10 of the 37 patients had values below 80 per cent. None was below 60 per cent, however.

Synthetic vitamin K (2-methyl-1, 4-napthoquinone, dissolved in corn oil)* was given orally in amounts of 6 milligrams per day to 5 of the 6 patients with hypoprothrombinemia in the nutritional deficiency group, and to 8 of the 10 patients in the other series. The minimum period of treatment was 4 days. Bile salts were given with the vitamin in all cases to insure complete absorption. Two of the patients in the deficiency series showed a prothrombin response to the vitamin. One of these cases, a 78-year-old white man, gave a history of recurring attacks of active pellagra for many years. This patient had a prothrombin value only 33 per cent of normal and there was gross blood in the stools. Barium x-rays gave no evidence of gross gastro-intestinal lesions. Under vitamin K therapy, the prothrombin rose to 69 per cent in 5 days and the bleeding ceased. The second patient had an initial value of 69 per cent of normal which rose to 96 per cent after 3 days of the vitamin therapy. The remaining 3 patients in this series, and the 8 patients in the other group, failed to show any response to vitamin K.

*The 2-methyl-1, 4-napthoquinone was prepared at the State University of Iowa under the direction of Dr. G. H. Coleman, of the Department of Organic Chemistry. Vitamin K was furnished later through the courtesy of E. R. Squibb & Sons.

DISCUSSION

Both patients in which a vitamin K deficiency was demonstrated by the response to specific therapy gave a history of prolonged and severe diarrhea. It has been shown that faulty absorption from the intestine in various types of intestinal diseases[8,9] may at times result in a vitamin K deficiency. Thus it seems likely that in these 2 patients the severe diarrhea rather than deficient diet *per se* was responsible for the vitamin K deficiency.

The frequency with which moderate hypoprothrombinemia (65 to 85 per cent of normal) was found in both series is of considerable theoretical interest. That it is not the result of vitamin K deficiency in most of the cases is shown by the fact that the administration of large amounts of the vitamin did not influence the prothrombin level. Just why many patients should have a subnormal plasma prothrombin level is not immediately apparent. One might hypothesize subnormal prothrombin production as a result of general debility. The suggestively higher incidence of moderate hypoprothrombinemia in the Iowa City series would be in accord with this hypothesis. Chronic debilitating diseases were more prevalent in this group than in the group seeking medical attention primarily because of nutritional deficiency. Better understanding of the formation and utilization of prothrombin in the future will perhaps make possible the elucidation of this interesting problem.

SUMMARY

Study of the prothrombin level in patients having pellagra and associated nutritional deficiency states indicates that a vitamin K deficiency is not common in cases of this type. Complicating factors, as prolonged diarrhea, do at times, however, result in a serious deficiency of this vitamin. Many chronically debilitated pa-

tients have a moderate hypoprothrombinemia which apparently is due to causes other than vitamin K deficiency.

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"POT LIQUOR": A NEGLECTED SOURCE OF VITAMIN C FOR THE FEEDING OF INFANTS*

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and

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The use of "pot liquor," the water in which vegetables and fat meat have been boiled, as a supplemental food for babies is a time-honored practice in nonscientific infant feeding in the South. As more and more babies have come to be fed under clinical supervision the older customs have been discarded with the adoption of a more conventional infant dietary of boiled milk formulae supplemented with cod liver oil and either tomato or orange juice as sources of additional vitamins. There can be no argument as to the fact that careful adherence to the more scientific plan of feeding has enormous advantages in both safety and nutritional adequacy over the older hit or miss system of infant feeding. All too often, however, the older customs have been discarded while for economic reasons or through ignorance, carelessness, or prejudice, the prescribed diet is only partially adopted. As a result, many infants receive a milk formula without supplements and suffer from a lack of certain vitamins. In our recent survey[1] of the state of nutrition with respect to vitamin C it was found that a considerable percentage of the younger children of our clinic group gave evidence of a moderate or serious lack of this vitamin as indicated by reduced levels of ascorbic acid in the blood serum. As was to be expected, the finding of the lower levels of ascorbic acid usually occurred in children deprived of fruit and vegetable supplements and given a diet consisting of a milk formula, or such a formula and cereal. Our advice to supplement such a diet with orange or tomato juice often met the economic impasse that the family budget would not allow such additions. It seemed desirable, therefore, to investigate possible cheaper sources of vitamin C suitable for infant feeding which could be suggested when the more conventional sources were out of economic reach. A hint as to such a possible source came from further study of the results of our earlier survey. A considerable number of infants with entirely satisfactory serum levels of ascorbic acid were found to have received no orange or tomato juice, but to have been given daily supplemental feedings of "pot liquor." We decided, therefore, to determine quantitatively the value of such a supplement in terms of its ascorbic acid content.

Only "pot liquor" derived from vegetables rich in vitamin C could be expected to contain significant amounts of ascorbic acid. Turnip greens, cabbage, and green beans are the most commonly used cheap vegetables in this locality. Of these three, turnip greens and cabbage are relatively rich in vitamin C, while beans contain very little. Experiments were therefore carried out in which the ascorbic acid content was determined (a) in fresh uncooked turnip greens and cabbage, (b) in these vegetables after cooking in the usual local manner with salt fat meat for two hours, and (c) in the "pot liquor" poured off the vegetables. Enough water was used in the cooking process just to cover the wilted greens.

Ascorbic acid was extracted from the vegetables with metaphosphoric acid according to the method of Bessey[2] and titrated with a solution of 2, 6-dichlorophenolindophenol of appropriate strength as described in our earlier paper.[1] A filtered aliquot of the solution obtained when the "pot liquor" was treated with an equal volume of a 10 per cent solution of metaphosphoric acid was similarly titrated. Only the reduced form of ascorbic acid was measured. Chemical evidence that the reducing substance measured by this titration was ascorbic acid was derived from the fact that it could be completely destroyed by the same reagents and under the same conditions which lead to an oxidation of pure reduced ascorbic acid.

*Received for publication October 25, 1940.

*From the Department of Pediatrics, Vanderbilt University School of Medicine.

Uncooked turnip greens were found to vary considerably in their content of ascorbic acid. The amount present probably depends on several factors, including the length of time the vegetable has been picked, the rate and luxuriance of growth, and so on. As purchased in our local markets, ten samples of uncooked greens were found to have ascorbic acid contents ranging from 75 to 160 mg. per 100 grams, with an average of 115 mg. After cooking as described above and pouring off the free "pot liquor," the same ten samples of cooked greens contained from 14 to 32 mg. per 100 grams with an average of 22 mg. The "pot liquor" from these greens contained from 0.14 to 0.32 mg. per c.c. with an average of 0.23 mg. Similar studies with cabbage showed that the fresh uncooked vegetable contains about 40 to 60 mg. of ascorbic acid per 100 grams, cooked cabbage about 10 mg. per 100 grams, and "pot liquor" from cabbage about 0.11 mg. per c. c. A few typical results of our larger series are collected in *Table 1*. A study of our results shows that about half of the original ascorbic acid content of these two vegetables is destroyed by the usual method of cooking. In spite of this, the liquor obtained from turnip greens has a concentration of ascorbic acid equivalent to that present in tomato juice and about one-half as great as that of fresh orange juice. About four ounces of such "pot liquor" would meet the generally accepted daily requirement of an infant for 25 to 35 mg. of ascorbic acid. "Pot liquor" from cabbage, while less rich in vitamin C, still contains enough to make it a valuable supplement when richer sources are not available.

As a further proof that these sources of vitamin C were as valuable as our figures would indicate, we carried out a few biological experiments. Human subjects were chosen in whom the level of ascorbic acid in the blood serum had been reduced by a diet deficient in vitamin C. "Pot liquor" was then added as the only supplement to the same diet. On this regime the ascorbic acid content of the blood serum rose at approximately the same rate as when pure ascorbic acid was administered in amounts equivalent to that calculated to be present in the liquid consumed.

Table 1

MG. ASCORBIC ACID PER 100 GRAMS

Raw Greens	Cooked Greens	"Pot Liquor"
120	25	25
80	19	19
96	15	16
142	27	27
160	28	28

Before recommending the use of "pot liquor" with too much confidence, however, it seemed desirable to try cooking the vegetables under a variety of conditions such as might be used in different homes. In the experiments above the vegetables were cooked in pyrex glass beakers. It is well-known that even traces of copper catalyze the destruction of ascorbic acid. Our next step, therefore, was to carry out the same method of cooking in a variety of inexpensive tin, aluminum, and enameled dishes. Essentially the same results were obtained with any type of dish likely to be in ordinary use. Naturally brass or copper dishes must be avoided. In other experiments the duration of cooking was varied, and in still other instances the meat was omitted and the vegetables cooked in water or in salt and water. The duration of the cooking process was the only variable found to make any significant difference in the amount of ascorbic acid destroyed. Excessively long cooking for periods of six to eight hours resulted in a considerably greater loss than did the two-hour period adopted for most of our experiments. Cooking periods of less than two hours left a greater portion of the ascorbic acid in the cooked greens without a corresponding increase in the "pot liquor." If it is advisable to avoid pork fat a liquor equally rich in vitamin C can be obtained by cooking greens or cabbage in plain or slightly salted water. "Pot liquor" should be used on the same day that it is prepared, as the vitamin content gradually decreases.

It appears from these studies that the old custom of feeding "pot liquor" to babies was after all of value in that it furnished fairly adequate amounts of vitamin C. While we now know how to meet the requirements for this vitamin with more desirable food supplements, we would do well to advise the retention of the old custom in instances in which the more conventional sources of vitamin C are unavailable.

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ARIBOFLAVINOSIS, WITH SPECIAL REFERENCE TO THE OCULAR MANIFESTATIONS*

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It seems quite probable that knowledge of the clinical picture of riboflavin deficiency remains incomplete. At present there is evidence that characteristic lesions of the mucocutaneous junctions, glossitis, localized seborrheic dermatitis of the face and certain functional and organic disorders of the eyes are due to lack of the vitamin. Extensive dermatoses and serious systemic disturbances possibly may be results of severe prolonged deficiency. The dietary origin of many of these phenomena has been recognized for a number of years; they form an important part of the syndrome of classical pellagra. Occurring in the absence of pellagrous dermatitis, they have been called "pellagra fruste"[1] or "pellagra sine pellagra". Sebrell and Butler,[2 3] using experimental methods, first separated the signs of riboflavin deficiency from those due to lack of nicotinic acid and proposed the term "ariboflavinosis" for the syndrome. Like beriberi and pellagra, ariboflavinosis should be thought of as a complex metabolic disturbance resulting from prolonged partial deprivation of the B complex of vitamins, but with preponderant lack of riboflavin.

Riboflavin, nicotinic acid and thiamin are the reactive components of several coenzymes necessary for the fractional dehydrogenating process which results in the utilization of energy from carbohydrate. Riboflavin, in addition to its functions in carbohydrate metabolism, is necessary to intracellular respiratory processes and, like other vitamins, is supposed to be present in every living cell. The maintenance of normal biochemical reactions depends on the presence of a supply of all three vitamins adequate to meet the demand imposed by the available supply of carbohydrate. Absence or marked scarcity of any one of the group probably may cause the breakdown of the whole process.

The factors contributing to the development of spontaneous or endemic riboflavin deficiency theoretically are more numerous than those active in other B group avitaminoses. The vitamin is not abundant in many foods, it is not stable in alkaline media and it is rapidly changed to an inactive phase by the action of light. Though present as a complication of nicotinic acid deficiency in almost every case of endemic pellagra, ariboflavinosis is frequently seen as an apparently solitary avitaminosis due to poor dietary selection when an entirely adequate diet is available. In other instances ample amounts of foods rich in the vitamin may be eaten, but gastric achlorhydria may prevent the extraction of riboflavin from the food or permit its destruction in a medium of low hydrogen ion concentration. The phosphorylation of riboflavin which is essential to its function probably occurs in the small intestine and the compound is stored in the liver. Any condition which interferes with either of these processes may produce deficiency. The effect of light in producing local effects of riboflavin deficiency in the eye has not been adequately studied, but there is reason to suspect that prolonged exposure to bright light may cause destruction of riboflavin in the cornea with the production of ocular symptoms and signs in the absence of lesions of other structures.[4] A factor which may be important but which often is difficult, if not impossible to recognize, is gross imbalance of vitamin intake. Under experimental conditions the ingestion of large amounts of nicotinic acid by patients on a deficient diet seems to increase the requirement for riboflavin and precipitate the signs of ariboflavinosis. This phenomenon probably explains the high incidence of "relapse" of pellagra treated with nicotinic acid without improvement of the diet.[5 6 7] It is likely that many instances of riboflavin deficiency seen in patients whose diet is seemingly adequate may have a similar origin.

Many symptoms of which patients with ariboflavinosis complain are common to all avitaminoses and probably are the result of multiple deficiencies. Weakness, languor, rapid fatigue, anorexia, gastric discomfort and insomnia are such nonspecific complaints. Soreness of the lips and tongue, dysphagia due to painful fissures of the commissures of the lips and to tenderness of the tongue are characteristic. Pruri-

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*Read in Section on Medicine, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

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*This study was aided by a grant from the John and Mary R. Markle Foundation.

tus of the vulva or scrotum may be troublesome. Ocular symptoms have preceded all others with more than half of our patients and have occurred at some time in more than 90 per cent of them. Burning and itching of the eyes, photophobia, lacrimation, rapid visual fatigue, blurred vision, poor distant vision and inability to see distinctly in dim light are common "specific" complaints. In the absence of gross refractive errors or persisting after correction of such defects they are strongly suggestive of riboflavin deficiency.

The physical signs of ariboflavinosis are distinctive. In the experiments of Sebrell and Butler[2] [3] the first lesion was pallor and maceration of the commissures of the lips with the formation of fissures extending outward from the angles of the mouth. Later the lips became abnormally red along the line of closure, apparently from denudation of the mucosa. In addition to cheilosis there was a fine scaly, slightly greasy desquamation on a faintly erythematous base in the nasolabial folds, on the alae nasi and on the ears. Subsequent observations[7] [8] [9] [10] have shown that redness may extend to the buccal mucosa with the production of mild stomatitis. Quite regularly a specific sort of glossitis can be recognized.[9] [10] The color of the tongue is purplish-red or magenta rather than the scarlet of nicotinic acid deficiency and the papillae become flattened or mushroom-shaped so that the texture is coarsely granular; fissures are frequent. Fissures may occur at the commissures of the eyelids and on either side of the nasal septum. The secretion of the sebaceous glands of the face may become altered so that inspissated, almost hairlike comedones develop over the forehead, malar eminences, alae nasi or the circumoral region. This constitutes the "shark skin" eruption which has often been emphasized in descriptions of pellagra. Seborrhea may involve the scalp and in rare instances the entire body. Less frequently there is dry itching dermatitis of the scrotum or vulva.

Mydriasis and disturbances of accommodation are common in patients with ariboflavinosis, and along with these there is apt to be congestion of the scleral vessels.[7] [9] [10] [11] Not infrequently examination with an ophthalmoscope or hand lens will show circumcorneal injection not visible to the unaided eye. Inspection with a slit lamp is necessary, however, for recognition of the characteristic vascularization of the cornea, which often is the first and may be the only sign of riboflavin deficiency. The earliest microscopic change is a marked increase in the number and size of the vessels composing the limbic plexus. The normal avascular zone between the plexus and the sclerocorneal junction is overrun by minute vessels from which spring capillary loops which outline the scleral digitations. (The limbic plexus varies much in its distribution and is much more prominent in young persons than in the elderly, but we have not observed an instance in which an arcade of capillaries framing the scleral projections has not been proven to be abnormal.) Under experimental conditions within a few days, often only two, empty capillaries can be seen arising from the apices of the loops outlining the scleral projections. These capillary sprouts lie immediately beneath the corneal epithelium and extend centripetally. In two or three days more they form complete loops through which red cells circulate irregularly and in clumps. The efferent limbs of such loops are often difficult to see. Such vessels grow rapidly and anastomose with adjacent capillaries to form a secondary arcade of loops lying within the cornea. From this more sprouts develop and grow centripetally with many anastomoses until an extensive superficial plexus is formed which may cover the peripheral two-thirds of the cornea. Later and usually after several recurrences of ariboflavinosis, vessels may invade the substantia propria at all levels and eventually produce a scanty posterior plexus lying just proximal to Descemet's membrane. It is characteristic of dietary keratitis that vascularization is predominantly superficial. Even in long-standing cases with many large vessels in the subepithelial zone and substantia propria the posterior vessels are small and relatively few.

Early in some instances, but usually only after prolonged deficiency, diffuse nebulae develop at various levels in the substantia propria. The size and distribution of nebulae have been quite irregular in cases which the authors have observed and have had little relation to concurrent oral signs of ariboflavinosis. Experimental observations indicate that such opacities are due to an accumulation of leukocytes. It is likely that such diffuse opacities depend on the grade of vascularization of the cornea which develops in a given instance. Superficial punctate opacities are common in patients with moderately severe keratitis and may be the result of changes in the epithelium. Posterior deposits have not been seen. Nebulae and anterior punctate opacities may be important in the causation of the dimness of vision complained of by

a number of patients. Extensive corneal scars, undoubtedly the result of corneal ulcers, have been seen in five patients.

The relation of nutritional keratitis to other types is a matter which must be decided by ophthalmologists. Recently Johnson and Eckardt[4] have reported on the response of rosacea keratitis to riboflavin therapy. There is no doubt that the condition they denominate rosacea keratitis is the corneal vascularization of riboflavin deficiency. Syphilitic keratitis differs from the condition we have described in that vascularization is apt to be predominantly posterior with great numbers of vessels just anterior to Descemet's membrane, very many in the substantia propria and relatively few in the superficial zone. The development of nebulae and of posterior and anterior opacities is also much more frequent. Nevertheless, we have observed five cases of syphilitic keratitis in which treatment with riboflavin was accompanied by rapid improvement during periods when antisyphilitic drugs were withheld. These patients had received intensive specific therapy without significant improvement of the ocular condition. It is possible that syphilis may produce keratitis only when the oxygen supply of the cornea is impaired by riboflavin deficiency. It is also possible that the presence of treponemata may interfere with normal corneal respiration and that additional supplies of riboflavin relieve local anoxia.

Changes in the appearance of the iris have been observed in about one-third of our patients with signs of ariboflavinosis. Five had frank iritis which healed in each instance during treatment with riboflavin. The others had a condition best described as hyperpigmentation of the iris. In gray- or blue-eyed individuals this took the form of brown or yellowish-brown accumulations of pigment-bearing cells not to be differentiated at present from "hazel spots." In brown-eyed persons the architecture of the iris was obscured by shaggy accumulations of the melanophores. Neither condition was recognized as abnormal until marked dispersion of the pigment or pigment-bearing cells was seen to follow the administration of riboflavin. Much further study will be necessary to evaluate the significance of these observations.

The amount of riboflavin required for satisfactory improvement in any instance is conditioned by the adequacy of the diet and by the ability of the patient to extract and utilize riboflavin from natural sources. Under experimental conditions with a diet extremely poor in all vitamins but adequately supplemented with all but riboflavin, 5 milligrams daily by mouth has been the average amount required for rapid cure. In the presence of gastric achlorhydria, diarrhea or severe hepatic disease, 10 or 15 milligrams daily may be required. In cases of severe polyavitaminosis with vomiting and diarrhea, 10 or 15 milligrams of sodium riboflavin given intravenously may be required. Under uncontrolled conditions with a tolerably adequate diet, 3 milligrams daily are adequate for the cure and maintenance of the great majority of patients. A few patients require much larger amounts; gastric achlorhydria and constant exposure of the eyes to bright light have seemed important conditioning factors in this group. The presence of subclinical hepatic disease may have much effect on individual requirement.

Following the administration of riboflavin* we have observed rapid symptomatic improvement in our group of some 120 patients. Photophobia may be relieved after 72 hours of treatment; dim distant vision and twilight blindness may be cured in the same time. Mydriasis and accommodation defect disappear concurrently. Dysphagia, gastric discomfort and general malaise have seldom persisted after the third day of treatment. Glossitis is the first anatomical lesion to show changes; in a great majority of instances the tongue is restored to normal color and texture by the third day. Corneal vessels respond almost as rapidly. On the third or fourth day of treatment there is obvious emptying of the smaller capillary channels and interruption of the flow of blood in the larger ones. In very early cases all invading capillaries may be empty by this time. In patients with severe keratitis maximum improvement occurs during the second week of treatment; by then all capillaries are empty. Large vessels are not obliterated after as long as a year, though they are much diminished in size. Empty vessels of capillary caliber may remain visible as long as a year after adequate treatment has been instituted. The shortest time we have noted for the complete disappearance of subepithelial capillaries has been 10 months.

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*Pure synthetic riboflavin used in our study was supplied by the Winthrop Chemical Company, E. R. Squibb & Sons and Merck & Co.; solution of riboflavin in propylene glycol for intramuscular injection was supplied by the Winthrop Chemical Company; sodium riboflavin for intravenous injection was furnished by Merck & Co.

COMMENT AND CONCLUSIONS

Conjunctivitis and visual disturbances occurring in conjunction with lesions of the lips and skin now known to be signs of riboflavin deficiency have been described for about a hundred years[13 14 15 16] and ocular lesions produced by vitamin deficiency in animals have been recognized ever since Goldberger separated the heat-stable pellagra preventive fraction of yeast from the thermolabile antineuritic portion. Time does not permit a review of the fundamental investigations which identified riboflavin as the vitamin concerned with prevention of lesions of the cornea and lens in rats and other experimental animals. Bessey and Wolbach[20] first used the slit lamp to inspect the eyes of rats deprived of riboflavin and noted that corneal vascularization was the first and most constant sign of disease. Their observations were confirmed by the almost simultaneous report of Eckardt and Johnson.[21] Spies, Bean and Ashe[6] and Spies, Vilter and Ashe[7] observed photophobia and poor visual acuity in a large number of their patients with polyavitaminosis, many of whom showed mydriasis and conjunctivitis. These authors suspected that vitamin A deficiency was the etiologic factor in such ocular disturbances, but noted that the administration of riboflavin produced improvement in a large number. Pock-Steen[12] was one of the first to describe the symptoms and gross ocular signs of riboflavin deficiency in detail. He reported cure of a great majority of his patients with minimal doses of riboflavin administered parenterally. Kruse[10 11] and his associates were able to correlate the observations of other investigators and to apply the slit lamp to the study of human ariboflavinosis. At the present time it seems that superficial vascular keratitis is the earliest and most common visible manifestation of riboflavin deficiency as well as a rather reliable index of early deficiency of the B group of vitamins.

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DISCUSSION (*Abstract*)

Dr. W. B. Bean, Cincinnati, Ohio.—It is always stimulating to listen to a paper which has such clear-cut observations as have been recorded by Dr. Sydenstricker. My comments will be chiefly questions on the few differences that we find from what he has shown in his work in Georgia.

I suppose men working in deficiency diseases in different parts of the country all must realize now that apparently there are quite distinctive local differences in different regions. Why that should be I am not prepared to state, but it certainly is true that in Cincinnati and Birmingham and Cleveland the patterns of deficiency disease are different; that is, in one place one type of lesion is more prominent, and in another place another type of lesion. What the factors are I do not know. It may be that food in different areas is different in its vitamin and mineral content, but I think there was a time when workers in different parts of the country felt that all other observers in nutrition were either careless or were not telling the truth, because what they found in each place in deficiency disease did not agree.

I should like to ask if Dr. Sydenstricker has any idea why in riboflavin deficiency there is a much longer lag in the response to treatment than one sees in treatment with any other of the known factors, particularly when given parenterally. Nicotinic acid usually brings out the manifestations of change in a period of six hours, twelve hours, and at the most twenty-four hours; at least one can notice some change. The response to thiamin is usually within a few hours in cases that do respond to it, and in the few cases that respond to

vitamin B_6 the change is almost instantaneous. By analogy one would suppose that the response to riboflavin would be prompt. I should like to ask if there is any explanation for its delay.

I also should like to ask if he has any explanation for the physiochemical change that produces the curious color of the tongue.

I should like to ask him if he has done any work on culturing the lesions at the angles of the mouth with regard to some of the curious changes, for instance, cases that show one side healing while the other side is getting worse, which occasionally occurs in lesions of this type.

Dr. Spies has found in many cases pure cultures of either hemolytic Staphylococcus aureus or hemolytic streptococcus in these lesions, and these organisms disappear after riboflavin is given and the lesion heals. What that relationship is I am not sure, but presumably it is just a complicating secondary factor.

Dr. Herbert S. Alden, Atlanta, Ga.—It is little short of sacrilege for a dermatologist to invade an internist's meeting, but ever since I first read Dr. Sebrell's article and heard Dr. Sydenstricker talk of these things, I have been interested in them from a dermatologic standpoint. Of course, we see much seborrheic dermatitis. We dermatologists often observe eruptions in the skin which Dr. Sydenstricker has shown you on the screen. The dermatologist has, for years, recognized two types of seborrheic dematitis; one, the dry, itchy, scaly type with erythema around the edges of the scalp, quite frequently in the ears, and in the nasolabial fold an eruption which is often associated with blepharitis and sometimes keratitis. This type of seborrhea also occurs on the neck and chest and back. It itches, it is dry and scaly and occurs generally in well-nourished, healthy individuals. There is another type of seborrheic dermatitis which closely approximates the pictures shown by Dr. Sydenstricker, that I should like to designate as the "wet-type" in which the patient presents edema around the eyes, an oozing eruption in the nasolabial fold, a nasitis, if I may use such a term, in the mucocutaneous junction of the nose, and crusting. Often it appears under the arms, under the breasts (particularly in pendulous breasts) and in the vulvovaginal region, in the groin, and around the anus. This "wet-type" which has been called "seborrheic dermatitis" and which is obviously different from the first type, usually does not itch, and more often occurs in persons who are ill or ill-looking.

Until Dr. Sydenstricker described this clinical picture as a possible avitaminosis, these patients, to us, were unknown entities. About four years ago, Drs. Clay and Baird (ophthalmologists) and Dr. Jones and I observed three patients who showed this curious eye condition with edema, blepharitis, photophobia, the nasal infection and a sore mouth. In these three patients we had no idea of the diagnosis, and therefore, had no approach to the treatment. Since this discussion has come up, I have re-examined them. One of them apparently spontaneously got well, due, I am sure after questioning her, to the fact that her circumstances became better, the family was smaller and she was able to get better food. The other two patients have had recurrences and exacerbations. One of them has improved following the relief of a pelvic infection, the use of bismuth and better living conditions, and is now on a continuous dose of riboflavin to prevent any further difficulty. The other, a young girl, has continually had exacerbations regardless of treatment. She seems to do well when she takes riboflavin, and the condition recurs when she is not under this drug.

We have two other patients with the typical skin eruption of ariboflavinosis both of whom now are doing well under riboflavin but they seem to have to have a continuous intake of riboflavin. In both of these instances they have had recurrences in two weeks if they discontinue the drug. In addition they take vitamin B complex. No matter whether they have an adequate diet or not, the condition seems to recur.

I should like to have the answer to the previous discusser. A lady who has a typical pellagra and did not do well under nicotinic acid alone, did begin to clear up after the addition of riboflavin, but she did not get the dramatic result that we are accustomed to observe in pellagra. She had to have riboflavin at least three weeks before she showed much change in the symptoms. I should like to have an explanation for this lag in symptomatic relief.

Dr. Sydenstricker also mentioned rosacea as a part of this complex. I think that this term is used rather vaguely by most general men. The usual type of rosacea (acne rosacea or rosacea complex) clinically is quite different and easily differentiated from Dr. Sydenstricker's avitaminosis. True rosacea occurs in over-fed people: they have a decidedly red nose and are of the English beef-eater type. I do not think true rosacea would come within his classification of avitaminosis.

Dr. Sydenstricker (closing).—I think that the lag in the healing of the cutaneous lesions in riboflavin deficiency has been noted and it has been a universal experience that whereas a person with pellagra starts off with a rather spectacular change within twenty-four hours, it ordinarily takes at least three days, and more often five to seven days, for startling changes to occur in ariboflavinosis. The answer I do not know. One does see much more rapid change in the capillaries of the cornea. Not uncommonly a patient with early keratitis, if given moderately large amounts of riboflavin, that is to say from five to ten milligrams a day, will show as much as twenty-five or even fifty per cent emptying of the capillaries within twenty-four hours, and often complete emptying in a matter of a few days. It is a thing which I presume (I can only guess) is due to slower action of riboflavin; in dermatitis, the mechanism is something we do not know.

The color of the tongue is just as much a mystery to me as to anyone else. Inspected with a microscope magnifying 20 diameters, what we call riboflavin tongues show the papillae flattened and looking more like a dead jelly-fish that has been washed up on the beach than anything else, a round, translucent hemisphere with the capillaries lying deeply in a loose coil. It may be that some dilatation of the capillaries gives the intense purplish appearance to these tongues.

I want to thank Dr. Alden for answering some of the questions which have been exceedingly puzzling to us from the standpoint of dermatology. We are quite certain that all seborrheic eczema cannot be ariboflavinosis; on the other hand, we have seen such striking cure of a few cases that we were glad to have the dermatologists take the matter up seriously to see whether they could sort out the definite types of seborrheic ecze-

ma. The same applies to rosacea. Certainly the term "rosacea" applied to the condition which we call ariboflavinosis does not fit with the usual acne rosacea with the red nose and dilated venules, but it does correspond at least roughly to the more or less moist and seborrheic type of rosacea.

Again, I cannot answer the question as to the relatively slow response of the skin lesions to specific treatment.

STUDIES IN RADIATION SICKNESS. II*

VITAMINS B_1 AND C AND THE SMALL INTESTINAL CHANGE IN RADIATION SICKNESS

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INTRODUCTION

In an earlier communication, the author[16] has described a series of typical changes in the gross appearance of the small intestine appearing after a heavy series of roentgen irradiation for pelvic tumor, namely, carcinoma of the cervix. These changes were found with considerable regularity and were not present when the patients were examined as normals before roentgen therapy was begun.

Briefly, the small intestinal changes found in the previous investigation were as follows. The duodenum and jejunum showed no variation. The prominent changes appeared in the ileum, where there was segmentation of the barium stream, flattening of the mucosal pattern, diminution in motility, and narrowing of the lumen.

The similarity between these effects and the ileal abnormalities seen in chronic deficiency states[6 9 13] prompted the author to investigate the possibility that an actual avitaminosis might be in part responsible for the syndrome of radiation sickness due to failure of absorption of essential food materials from a physiologically impaired small intestine. The previous investigation tended to prove that a chronic vitamin deficiency state was not the entire explanation for radiation sickness, as all the small intestinal change was confined to the ileum and the change in chronic deficiency states is observed most commonly in the duodenum and jejunum,[6 9 13] which lay outside the treated area, but would undoubtedly be affected if a generalized avitaminosis were produced by irradiation.

LITERATURE

In addition to the similarity between the ileal findings in late cases of roentgen sickness and in cases of avitaminosis there have been a number of reports[8 11 15] in the literature concerning the efficacy of vitamin preparations, particularly synthetic thiamin chloride, in symptomatic relief. These reports have enthusiastically approved of B_1 as almost a specific for the amelioration of the anorexia, nausea and vomiting, but they have continually disregarded the accompanying diarrhea, one of the most prominent and unpleasant features of the syndrome. In observation of a considerable number of cases, the author had observed that, while large doses of thiamin chloride caused considerable symptomatic improvement in the matter of nausea and vomiting, there was no appreciable change in the extent of the accompanying diarrhea.

In addition to the possible production of an avitaminosis due to faulty intestinal absorption in individuals under heavy roentgen therapy, it has been shown[14] that there is a B_1 deficit in the cachexia accompanying advanced cancer of all types.

There have been a number of reports[12 20] of the value of liver extract in palliation of radiation sickness, and it seems likely that this effect may, in part, be due to the B_1 content, although the other factors in liver extract probably play a larger part in the relief of symptoms.[1 2 3]

There has been definitely established[5] a quantitative lack of vitamin C in untreated cases of advanced carcinoma of the cervix.

Since the alteration in intestinal activity accompanying the administration of heavy doses of irradiation could very readily produce avitaminoses, there is definite evidence that the bowel change in prolonged irradiation resemble those of the avitaminoses B_1 and C, and there is evidence that avitaminoses B_1 and C are already present in carcinoma of the uterine cervix, it was decided to investigate the matter from the point of view of the gross appearance of the small intestinal mucosa, with the end of determining whether large supplementary vitamin dosage caused a qualitative effect upon the changes produced by long-continued irradiation.

Unfortunately, there is very little pathologic material available for determination of the effect

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*Read in Section on Radiology, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

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*The preparation of this material was greatly aided by the technical assistance of James G. Whildin, M.D., and Ruth Alexander, R.N.

of non-damaging therapeutic doses of radiation upon the bowel. Most of the information at hand[4 10 17 19] is derived after giving damaging doses to experimental animals. While it is highly likely that the changes produced by therapeutic doses are milder stages in the sequence leading to ultimate destruction of tissue, there is no definite evidence that this is so.

CHANGES IN THE OVER-RADIATED BOWEL

The pathologic changes[4] in the over-radiated bowel in experimental animals, a less severe degree of which could well cause the changes described by the author, are:

(1) Increased tone with spastic contraction.

(2) Mucoid degeneration, vacuolization and desquamation of the epithelial cells, beginning with the cells overlying the lymph follicles and the crypts, later extending into the cells covering the villi.

(3) Atrophy of the villi.

(4) Hyperemia and edema.

(5) Occasional mucosal ulceration.

(6) Bacterial accumulation on the denuded surfaces.

(7) Leukocytic infiltration.

(8) Ultimate mucosal regeneration or connective tissue proliferation to replace the destroyed cells.

SELECTION OF CLINICAL MATERIAL

A representative group of previously untreated cervical carcinoma patients from the public service at Duke Hospital were subjected to a searching preliminary study of the gastro-intestinal tract and, from these, ten cases without demonstrable lesions were selected. These ten patients then received the usual course of radiation, which varies slightly with the general physical condition of the patient and the stage of the disease.

Heavy daily doses of vitamin B_1 were given concurrently to five of the patients and heavy daily doses of vitamin C were given to the other five. The small intestine was re-examined at the end of the series of radiation.

TECHNIC OF IRRADIATION

At Duke Hospital, for several years we have treated all cervical carcinoma patients under a fairly definite routine, a modification of the method advocated by Healy,[7] with slight variation in individual dosage. These ten patients each received between 2,000 and 2,200 r to each of six ports, generated at 400 kv. and filtered with 4 mm. of copper with a half value layer of 5 mm. of copper, or generated at 200 kv. and filtered with 1 mm. of copper with a half value layer of 2 mm. of copper. In addition, eight of them received supplementary intravaginal radiation doses, ranging from 2,500 to 5,000 r generated at 200 kv. and filtered with 1 mm. of copper with a half value layer of 2 mm. of copper. (A supplementary filter of 1 mm. of aluminum is always used in addition.)

We believe that a strict adherence to the following principles enables us to attain a higher total dosage to each port with less absolute discomfort to the patient:

(1) Each day each of two opposing 10 by 15 cm. ports, right and left anterior, right and left posterior, and right and left lateral, are treated.

(2) The anterior and posterior ports on each side meet in the midline.

(3) The central ray is always directed perpendicularly to the plane of the table top and no attempt is made to incline the beam and crossfire the cervix.

(4) Each of the first three days, each of two opposing ports receives 150 r.

(5) Each of the second three days, each of two opposing ports receives 200 r.

(6) Each of the third three days, each of two opposing ports receives 250 r.

(7) Each remaining day, each of two opposing ports receives 300 r until the desired total dosage is reached.

(8) If supplementary intravaginal radiation is used, it is given every fourth day in doses of 500 r.

VITAMIN DOSAGE

The five patients who were treated with B_1 received daily intramuscular injections of 10 mg. of synthetic thiamin chloride, corresponding to 3,000 international units. The patients receiving C were given daily doses of 50 mg., or 1,000 international units, of sodium ascorbic acid, in the form of Lilly's "cevalin." There was no evidence of unusual reaction to either vitamin preparation.

EXAMINATION OF THE SMALL INTESTINE

Both before and after the course of radiation the gastro-intestinal tract, from mouth to cecum, is examined by a standard technic.[6 13 16] The

patient drinks three ounces of chemically pure barium sulfate in six ounces of water. No flavoring material of any kind is used to forestall any possible effect of such material upon the intestine.[6 13] For the same reason, no drugs are given, during the course of treatment, for pain or any symptom of radiation sickness which may arise.

While the meal is being swallowed, the esophagus, stomach, and duodenum are examined fluoroscopically. At the end of a fifteen-minute period, the patient is roentgenoscoped in the supine position, and a film is taken to show the duodenum and its junction with the upper jejunum. Further fluoroscopic examinations and prone films are made at hourly intervals, until the barium meal has traversed the entire small intestine. The head of the column usually reaches the ileocecal valve in two hours.

GENERAL CONDITION OF PATIENTS WHO RECEIVE HEAVY VITAMIN DOSAGE CONCURRENTLY WITH PROTRACTED PELVIC RADIATION

While the patients treated with either B_1 or C were uniformly more comfortable subjectively, and experienced severe nausea much less commonly than other patients receiving a similar course of radiation unaccompanied by vitamin therapy, severe diarrhea occurred a little more frequently in the cases receiving supplementary vitamins. We are at a loss to account for this discrepancy. In addition, the psychic support of daily parenteral injections was at least in part a contributing factor in maintaining the morale and the feeling of well being in some cases.

THE SMALL INTESTINE IN PATIENTS RECEIVING HEAVY VITAMIN DOSAGE CONCURRENTLY WITH PROTRACTED PELVIC RADIATION

Every patient in this series, when the small intestine was examined at the end of the series of radiation, showed some pattern changes in the ileum. As in the cases previously treated without supplementary vitamins, no gross changes could be observed in the duodenum or jejunum. Segmentation of the barium stream was seen in nine of the ten cases, and definite ileal hypomotility, as compared to previous normal individual motility, in seven of the ten. The incidence of these two changes was exactly the same as it was in a previous series of patients who received roentgen therapy alone. Further, every one of the ten cases showed some degree of variation in the ileal pattern, ranging from slight decrease in depth of the markings to complete loss of pattern with a narrowed, tube-like wall.

DISCUSSION

That both vitamin B_1 and C are of value in forestalling the general symptoms of radiation sickness is evident, but they are not of apparent value in prevention of the accompanying diarrhea, and they do not prevent the development of changes in the gross appearance of the small intestine following heavy radiation dosage.

According to Bean and Spies[1] and Crandall, Chesley, Hansen and Dunbar,[2 3] whom they quote, thiamin chloride alone does not exert very much control upon the intestine and most of the intestinal effect of the vitamin B complex is due to its other factors. A point of possible pertinence in the relation of B_1 to alleviation of roentgen sickness is the possibility that heavy doses of B_1, relieving the nausea and vomiting, may allow ingestion and absorption of increased amounts of other members of the complex, establishing a benign cycle in sharp contrast to the vicious cycle of B_1 deficiency.

As there is no valid reason to believe that the C deficit is greater in heavily treated than in untreated cases of cervical cancer, it must be deduced that the clinical improvement with C therapy is due to simple replacement.

The doses of B_1 and C used were quite large, and it seems quite apparent that larger doses would have no further effect. Further studies, using the other members of the B complex, will be made.

CONCLUSIONS

(1) Heavy parenteral doses of vitamins B_1 and C, administered concurrently with radiation, prevent the appearance of many of the general symptoms of radiation sickness.

(2) B_1 and C administration almost entirely eliminates the severe nausea and vomiting.

(3) The use of either B_1 or C in no way diminishes the occurrence or severity of the diarrhea of radiation sickness.

(4) The characteristic ileal changes seen after heavy pelvic irradiation are not prevented by large doses of B_1 or C.

(5) The ileal changes after heavy pelvic radiation are apparently not due to avitaminoses B_1 or C.

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DISCUSSION (*Abstract*)

Dr. Edwin C. Ernst, St. Louis, Mo.—This is an important problem and I have always been a little pessimistic about attempting to do much in the way of medication largely because I have tried everything from chewing gum to orange juice and sedatives.

Some ten or twelve years ago, when we were doing work on rats, we found that if we irradiated them with certain small doses they showed a definite vitamin A deficiency. Vitamin A deficiency could be affected by radiation. If we failed to give the rats any vitamin A and gave very small doses of x-ray, the vitamin A deficiency was taken up by the rat and the rat lived on indefinitely. On the other hand, if we failed to give the rat vitamin B and it began to have the typical symptoms of vitamin B deficiency, and we gave him a larger dose of x-ray, the rat would live on for quite a long time. By that I mean almost along to the point of longevity of that particular rat. So the whole matter is complicated from the practical standpoint.

Whenever possible we should cooperate with the particular physician who is referring the case to us and let him work out with us the different vitamin problems that might be interesting.

More important than anything else, I believe, is the fact that frequently the patient eats less. He does not feel right and therefore he eats less, and as a result he becomes generally devitalized.

I should like to stress the dose. Each individual case, each individual patient and his lesion, has a peculiar idiosyncrasy or limitation to the dose he will take. I follow a rather wide range of treatment.

In many cases of diarrhea the dose is fairly large and may have accumulated. It might be interesting to use somewhat smaller doses to observe the effect.

Dr. Wright Clarkson, Petersburg, Va.—May I know if I understood rightly that you gave 300 r to each of two portals each day?

Dr. Joseph W. Kelso, Oklahoma City, Okla.—I should like to ask the essayist how much of this sickness is due to psychic disturbance. Does he think if these people were not told of the possible gastro-intestinal disturbance that their symptoms would be reduced in their severity? Just what part of this whole picture can be attributed to the fact that these poor people are sick and do not have the normal psychic reactions?

Dr. David Y. Keith, Louisville, Ky.—We do not experience very much radiation sickness as we are administering x-ray at the present time.

In high voltage and high filtration rarely do we give more than 200 r per day. I should think from Dr. Wallace's report that his dosage is high even though he is using 200,000 volts; because whenever you get above 300 r per day over the abdomen anywhere you are going to get some nausea.

It seems to me that we have gotten a higher percentage of relief in patients from using nicotinic acid than by any other treatment. We give 50 mg. in a glass of water about 30 minutes before meals. They sip it as if they were taking a beverage, taking ten minutes to ingest a glass of the solution.

Dr. Wallace (closing).—The answer to Dr. Ernst is that we are carrying on some experimental work, and the main difficulty, of course, is figuring out the dose that in the experimental animal will be analogous to the therapeutic dose in the human. We are working on that and hope to have some later material on it very shortly.

Dr. Clarkson, we do give 300 r to each of two portals every day, after we have built up a tolerance by starting them at 150 r to each of two portals.

In answer to Dr. Kelso, frankly I think that probably there is a great neurogenic factor in radiation sickness. It has been brought out innumerable times. Unfortunately, there is the factor of the patients talking among themselves while they are sitting waiting for treatments. Elimination of this would avoid a great deal of radiation sickness.

At the Presbyterian Hospital in New York each patient is put in a separate cubicle and kept from talking with the others.

Finally, Dr. Keith's discussion bears out what I have said before, that we are having better results with nicotinic acid than we have had with anything else.

A TEST FOR PREGNANCY*

TECHNIC AND COMPARATIVE RESULTS

By RICHARD PADDOCK, M.D.
St. Louis, Missouri

This test for pregnancy is based on the activity of the sex organs of the guinea pig. A number of years ago, when working with estrogenic substances in the guinea pig, it was noted that the appearance of the genitals of this animal could be used as an index of the potency of the substance being tested. Changes could be observed following the injection of estrogenic substances in the normal and in the castrated animal, as well as following the injection of material then thought to be stimulating to the ovaries.[1 2 3 4 5]

When the writer first made these observations, vaginal smears from the guinea pig were considered the best index as to the activity of the genital tract. It was soon noted, however, that the membrane covering the vagina interfered with taking smears except when the membrane was absent, as it was during the estrous period.

From then on the presence or absence of the vaginal closure membrane was used for an index as to the activity induced by substances being used. This observer learned that estrous-producing substances could be tested and even standardized by the effect produced on the vaginal tract of immature (8-12 days old) guinea pigs or, less accurately in the ovariectomized adult guinea pigs. This method of standardization is comparable to standardizations using the rat, mouse or rabbit.

On a number of occasions the injection of serum of pregnant women into a guinea pig produced changes in the vaginal tract similar to those seen in pigs in which estrogenic substances had been injected. This was then assumed by this observer to be due to the estrogens in the blood serum of the pregnant women.

It was not until a number of years later that the author considered the possibility of working out some method of observing the vaginal changes in the guinea pig as a test for pregnancy.

Earlier observations on guinea pigs kept for laboratory purposes established the fact that the opening of the vagina, by the disappearance of the vaginal closure membrane, occurred every 15 to 17 days. At this time there occurs a disappearance of the membrane and the characteristic secretion. The vaginal orifice remains open about 48 hours and then the membrane is reformed. Injection of estrogenic substances in sufficient quantity causes the membrane to disappear in 24 to 48 hours and the orifice to remain open for a day or two.

Since one pig normally has a cycle of 15-17 days, any test substance injected in one pig may be observed for activity with a normal error of one in 15 to 17, or more than 6 per cent. If two pigs are used, the correction for normal error, while less, is large enough to be misleading. Using three pigs as test animals for the same material reduces the normal incidence of error to a very small one. The probability that three female guinea pigs will come into heat simultaneously is about 24 in 10,000 cases, or the odds are 416 to 1 that this event will not occur.

A problem considered at first was the amount of blood serum to be injected. If a small amount be used, the quantity of change-producing substance may be too small to be effective. On the other hand, a larger amount may produce changes whether due to pregnancy or not, or the larger volume of blood may harm the animal. After working with various quantities of blood to be tested, it was concluded that the most satisfactory quantity of serum is 1.2 to 1.5 c. c.

It is unlikely that this amount of non-pregnant blood serum could produce the changes noted, by virtue of its estrogenic content. It now seems most probable that the effect is produced by the gonadotropic substances present in the serum acting on the guinea pig ovary. This in turn stimulates estrogen production and subsequent vaginal changes.

Technic of the Test.—Sufficient blood is drawn from the patient and collected in a sterile test tube. Approximately 10 c. c. or more of blood are required to yield sufficient serum for the test. The blood should be allowed to stand at room temperature for a few hours, or overnight, in the refrigerator. Blood kept in the refrigerator for several weeks does not lose its activity.

When ready for injection the serum is drawn off, either directly or after centrifuging. Blood

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*Read in Section on Obstetrics, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

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cells or considerable hemoglobin present do not interfere.

Three young female guinea pigs are selected for the test. When guinea pigs are first obtained for test purposes, 30 to 45 day-old guinea pigs are preferred. After being subjected to the test they may be returned to the group being used and may be used over and over again as long as they live.

Pigs for testing have a closed or intact vaginal closure membrane when selected. Swelling of the genitals or evident congestion of the parts should be noted, if it is present at the time of selection.

Each animal of the three selected is injected in the subcutaneous tissue of the pectoral region with 1.2 to 1.5 c. c. of serum and the time is noted. It is a good plan to massage the skin gently over the injected area. Rarely does the animal suffer any untoward effects following the injection.

At the end of 24 hours the test animals are inspected. If the vaginal closure membrane of any is open it is noted. While one is becoming familiar with the appearance of the animal parts it is a good idea to make several observations, especially after the first 24 hours. Final observations should be made at the end of 48 hours and the condition of the vagina noted.

If at the end of 48 hours the vagina in each animal is wide open or partly open, the test is positive for pregnancy. If two of the animals show open vaginas while the third is closed, the test is positive. In a test with this result the vagina of the third animal usually shows congestion or the appearance of imminent opening. One may delay final conclusions to observe this third animal for latent opening within the next eight hours.

If at the end of 48 hours only one animal has an open vagina and the other two are closed, the test is negative for pregnancy. Under such circumstances if the two animals in which the vagina did not open show evidence of marked congestion or appearance of expected opening, observations can be made longer, and in the event that both are open before the end of 72 hours, the test should be repeated on another set of test animals.

If none of the animals shows opening at the end of 48 hours the test is negative for pregnancy. Suggestive changes in all three of the animals may be observed through 72 hours and the test repeated if opening in two or three occurs between 48 and 72 hours.

Following the completion of the test the pigs should not be selected for further tests for at least a day or two. This permits the parts to resume normal appearance following any changes due to the injected blood.

It is to be noted that these procedures are exceedingly simple and require only a brief period of observation to become familiar with the appearance of the external genitals of the guinea pig.

Material and Results.—In the work to date a total of 254 tests for pregnancy were done. There were 72 positive tests and 182 negative tests in the series. In this series 28 guinea pigs were used. Of this number seven are still in use at the completion of the series. These remaining pigs may be used many more times. For this series alone each pig could be used on an average of nine tests (*Table 1*).

Number of tests in all	254
Number of guinea pigs used (Seven of these in use at conclusion of series)	28
Largest number of times any pig was used	95
Smallest number of times any pig was used (Two of these in use at conclusion of series)	2
Average number of tests per pig	9

Table 1

The greatest number of tests on any one animal was 95, and the smallest number, two on pigs still in use.

The tests in this series were run on blood samples submitted to the serology laboratory for the Friedmann pregnancy test, according to the method described by T. K. Brown.[6] The results in this series were compared with the results obtained by the modified Friedmann test. Where there was a disagreement in the results obtained by the two methods, an attempt was made to determine the clinical status of the case in question to see which result was correct. In a number of cases it was impossible to learn the subsequent course of the patient.

In the series the results of this test agreed with the results of the modified Friedmann test in 230 out of 254 cases. The first few cases in which the reactions failed to check with positive reactions by the modified Friedmann method were probably due to the fact that insufficient serum was used in all the guinea pigs.

A record of the variations of results between the two tests is as follows:

Cases that failed to show a completely positive reaction due to insufficient serum in all three pigs are 4.

Cases with a positive modified Friedmann and this test negative, 13.

Of these:

One pregnancy doubtful from record.

One positive at 33 hours, negative at 48 hours, patient pregnant.

One pregnancy considered doubtful by the patient's physician.

Six negative, could not check or verify.

One negative on account of atypical positive reaction.

Three negative in patients who had interruption of pregnancy later.

Cases with negative modified Friedmann reactions, this test positive, are 5.

Of these:

One patient was probably pregnant according to her physician.

Four patients were pregnant.

Cases with strong type I or weakly positive modified Friedmann, this test positive, are 2.

Of these:

One patient was pregnant, and a subsequent modified Friedmann test was positive.

A patient with delayed menses bled after the test was run. Pregnancy was doubtful.

SUMMARY AND CONCLUSIONS

The results of an original test for pregnancy using the guinea pig as a test animal have been presented. In this series a considerable number of the tests were considered largely experimental to determine the optimum quantity of blood serum to be used, and the optimum time at which readings should be made. No attempt has been made to establish in this series the period of pregnancy at which the reaction first became positive or how late in pregnancy and the puerperium the reaction remains positive.

Comparisons were made between the results in this test and the results in a standard test for pregnancy which was being used routinely in the laboratory of the Department of Obstetrics and Gynecology. It has been shown that the results of this test compare favorably in the majority of cases with the routine method now in use.

The error in the series presented appears to be toward the negative rather than toward the positive side. There were no single known false positive reactions.

The advantage of the method outlined lies in its simplicity and economy. It is quite easy to become familiar with the appearance of the genitals of the test animal. A relatively small number of animals kept on hand will suffice for a large number of pregnancy tests.

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DISCUSSION (*Abstract*)

Dr. W. T. McConnell, Louisville, Ky.—For a great many years before the advent of the Aschheim-Zondek test for pregnancy efforts were being made to find a reliable practicable test to determine whether or not gestation had become established.

Most of us remember the Abderhalden test. This test depended upon a serum reaction, but nothing was understood regarding the endocrine changes. The test was not reliable and not practicable, and it was not until the discovery made by Aschheim and Zondek that we were able to secure any reliable determination of the existence of the pregnant state. The original Aschheim-Zondek test depended upon the changes in the vaginal mucous membrane of female mice. Later Friedmann used young female rabbits and found this method very reliable and practicable. The disadvantages of these tests are that they are time-consuming and more or less expensive. Many simpler tests have been tried and most of them discarded. Falls and Bartlett, in 1914, experimented with placental extracts injected intradermally, but found a large number of nonspecific reactions. Cohen and Freda attempted to produce precipitin reactions and specific skin reactions that might be useful. These tests gave about a 75 per cent positive test.

Esch, Wintz, Gruskin and Schwartz have made similar tests, reporting a high percentage of correct diagnoses. Intradermal and conjunctival tests have been tried using the pituitary hormone, but as yet have not been proven practicable.

During the past year Falls has made a study upon colostrum injected intradermally, using 265 known pregnant cases, 350 controls, including known non-pregnant cases, of which 100 were adult males, 45 were children, 42 menstruating women, 50 postpartum cases, and 113 cases of either normal non-pregnant women or with various known gynecologic conditions. The test is considered positive if there is no reaction. This was found to be true in 98 per cent of the known pregnant women; 96 per cent of non-pregnant showed a characteristic wheal and areola. Children before puberty reacted like pregnant women.

Dr. Paddock's paper seems to us to hold hopes for a definitely practicable, simple and inexpensive test. It seems basically sound, first, because the reaction he secured is due to the estrogens in the blood stream of

women. Secondly, because of the simplicity of the technic it bids fair to be practicable.

Dr. Paddock (closing).—If you have access to any guinea pigs and at the same time have access to any pregnant women, I shall be very glad to have you try the accuracy of this test. If you have failures, let me hear from you.

THE INCIDENCE OF INTESTINAL PARASITES IN FECAL SAMPLES COLLECTED IN EASTERN OKLAHOMA*

By DONALD B. McMULLEN, Sc.D.†
Oklahoma City, Oklahoma
and
JAMES K. GRAY, M.D.‡
Tahlequah, Oklahoma

Various individuals and organizations have given us a rather complete picture of the incidence of intestinal parasites, especially the helminths, in the states south of the Mason-Dixon Line and east of the Mississippi River. W. P. Jacocks, of the International Health Division of the Rockefeller Foundation, made a helminth survey in Southeastern Oklahoma in 1914, primarily in Bryan, Choctaw and Pottawatomie Counties, where conditions resemble those found in the Southeastern states. Actually little is known about the incidence of the intestinal parasites in Oklahoma. It is reasonable to expect that the climate and other conditions that prevail in most of the State would produce a somewhat different picture than that found in the Southeastern states. The former survey, mentioned above, shows an incidence of hookworm of 22.5 per cent, *Hymenolepis nana* 1.2 per cent, and *Strongyloides* 0.6 per cent. Recent examinations for helminths and protozoa in fecal specimens from patients in University Hospital and students in the University of Oklahoma School of Medicine indicated that the incidence in the State was high enough to make a survey worthwhile. This project was made possible by a grant from the Medical Research Fund and the cooperation of Dr. Grady F. Matthews and the State Health Department.

It was impossible to examine fresh fecal specimens and the common preservatives make it increasingly difficult to distinguish between *Endamoeba histolytica* and *E. coli*. Experiments with fecal samples indicated that D'Antoni's iodine solution would serve well as a bacteriostatic-preservative and at the same time retain the characteristics of the various protozoan cysts. Wide-mouthed, screw-topped, four-ounce bottles were half filled with the iodine solution. A bit of the fecal specimen about the size of a pecan was added to this, emulsified and placed in a shipping case which was sent to the laboratory when filled. When received the samples were placed in an icebox until they could be examined.

The zinc sulphate floatation technic of Faust *et al.* was used in the examination for helminth eggs and protozoan cysts. The procedure has given good results even when the specimens were more than a month old. The principal disadvantage of this method is that it is impossible to detect trophozoites. For this reason the incidence of *Trichomonas intestinalis* has not been determined and the trophozoites of other protozoa in any stools that happened to be liquid when passed would not be found. In most liquid stools, however, a few cysts can usually be found so the resulting error was probably not great. Also, this method is not particularly useful in detecting pinworm infections, although it gives better results than direct smears.

To date 924 specimens have been examined. With few exceptions they were collected in Eastern Oklahoma and more than half of them came from Adair, Cherokee and Sequoyah Counties. These counties are located just north of the center of the State along the eastern border, in the country that received some publicity in "Grapes of Wrath." In certain individuals of our series the information regarding age, sex, etc., is incomplete. The number is small and although they are included in the tables, they will not be considered in the present discussion.

In *Table 1* a comparison is made between the rural and urban population. The greater part of the material came from rural areas with 725 specimens, while only 121 came from urban populations. In the rural population 63.4 per cent have one or more intestinal parasites, while the urban population shows only 33.1 per cent infection. The difference of per cent is statisti-

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*Read in Section on Public Health, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

*Supported by a grant from the Legislature for Research in the University of Oklahoma School of Medicine.

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RURAL-URBAN DISTRIBUTION AND PER CENT INFECTION IN STOOLS EXAMINED FROM EASTERN OKLAHOMA

Area	Protozoa						Helminths						Pos. Sto.	Neg. Sto.	Total	Per Ct. Pos.
	E. hi	E. coli	E. nana	I. bu	C. me	G. la	N. am	A. lu	E. ve	Ta	H. na	H. di				
Rural	85	365	103	39	12	54	9	3	4	1	46	1	460	265	725	63.4
Urban	3	28	14	2	5	4	—	—	—	—	—	—	40	81	121	33.1
Unknown	9	45	13	3	1	5	1	—	—	1	3	—	56	22	78	—
Totals	97	438	130	44	18	63	10	3	4	2	49	1	556	368	924	60.2
Per cent	10	47	14	5	2	5	1	.3	.4	.2	5	.1	—	—	—	—

Table 1

cally significant and has also been shown in studies of rural and urban populations in the Southeastern states.

This table also shows the per cent of infection with each species of parasite. They are as follows: *E. histolytica,* 10 per cent; *E. coli,* 47 per cent; *Endolimax nana,* 14 per cent; *Iodamoeba büetschlii,* 5 per cent; *Chilomastix mesnili,* 2 per cent; *Giardia lamblia,* 5 per cent; *Necator americanus,* 1 per cent; *Ascaris lumbricoides,* 0.3 per cent; *Enterobius vermicularis,* 0.4 per cent; *Taenia* species, 0.2 per cent; *Hymenolepis nana,* 5 per cent; *H. diminuta,* 0.1 per cent. *H. diminuta* has been reported from ten different states and the District of Columbia, but as far as I know this is the first to be reported from Oklahoma. Of the 12 species found, four of the protozoa are non-pathogenic, but they add to our knowledge by serving as an index to the amount of fecal contamination. Two hundred and twenty-nine, or about 27 per cent, of the infections were of organisms capable of producing clinical symptoms. This emphasizes once more the importance of routine fecal examinations.

It will be noted in this table and the others to follow that the sum of the infections with each organism far exceeds the number of positive stools, i. e., in the rural group the total number of infections is 720 as compared with 460 positive stools. This is due to multiple infections. Many specimens examined had double and triple infections, several had four and one had five different parasites.

With the exception of hookworm and ascaris none of these parasites requires development in the soil. *Taenia* and *Hymenolepis diminuta* are the only ones that require intermediate hosts. It will be noted that the incidence of all four of these parasites is low. All of the other parasites, shown to be the most prevalent, are acquired directly and the eggs or cysts are infective as soon as passed. The low incidence of *Taenia* and *H. diminuta* is to be expected and the small number of infections with hookworm and ascaris can probably be explained by the fact that the climate and the nature of the soil in this area serves as a partial control even where the soil is grossly polluted.

After visiting the area from which most of the samples were obtained, it is believed that

SEX DISTRIBUTION OF PARASITIC INFECTIONS IN STOOLS EXAMINED FROM EASTERN OKLAHOMA

Sex	Protozoa						Helminths						Pos. Sto.	Neg. Sto.	Total	Per Ct. Pos.
	E. hi	E. coli	E. nana	I. bu	C. me	G. la	N. am	A. lu	E. ve	Ta	H. na	H. di				
Males	47	218	68	22	6	36	7	—	2	2	26	—	282	190	472	59.7
Females	49	217	62	22	11	26	3	3	2	—	22	1	269	174	443	60.7
Unknown	1	3	—	—	1	1	—	—	—	—	1	—	5	4	9	—

Table 2

RACIAL DISTRIBUTION OF PARASITIC INFECTIONS IN STOOLS EXAMINED FROM EASTERN OKLAHOMA

Race	Protozoa						Helminths						Pos. Sto.	Neg. Sto.	Total	Per Ct. Pos.
	E. hi	E. coli	E. nana	I. bu	C. me	G. la	N. am	A. lu	E. ve	Ta	H. na	H. di				
White	14	80	27	5	9	27	—	—	1	—	8	—	21	136	257	47.1
Indian	69	304	87	35	7	23	8	3	3	1	26	1	353	160	513	68.8
Negro	10	40	11	3	1	10	1	—	—	—	14	—	65	64	129	50.4
Unknown	4	14	5	1	1	3	1	—	—	1	1	—	17	8	25	—

Table 3

direct infection and flies are the most important factors. In one community, visited particularly because of the high incidence, the homes had privies, but they were invariably poorly constructed and flies had access to the pits. The privies at the school in this community were of the WPA type, but due to abuse and lack of supervision they were of little use in preventing fly-borne diseases. The seats were obviously polluted and cysts of protozoa were recovered from scrapings taken from their exposed surface.

The sex distribution (*Table 2*) of the parasitic infections is approximately the same, with 59.7 per cent in males and 60.7 per cent in females. The number of infections with the various parasites in the two sexes shows some variation, but does not exceed that expected by chance.

The samples have been obtained from three different races, i. e., white, Indian and negro. The racial distribution (*Table 3*) shows some interesting features. The per cent of positive stools in the whites is 47.1, in Indians it is 68.8, and in negroes it is 50.4. The difference in per cent between whites and negroes is not significant. The difference of per cent between Indians and negroes is significant. The difference between whites and Indians is statistically significant.

With most of the 12 parasites listed the infections follow about the same ratio as the per cent of the positive stools in each race. One exception is seen in *E. histolytica*, where the incidence in Indians is 13.5 per cent as compared with 5.4 and 7.7 in whites and negroes, respectively. The difference of per cent of *E. histolytica* in Indians and whites is significant. Whites show more infections with *Chilomastix* than the other races combined. Indians show only a few infections with *Giardia*, 4.5 per cent as compared with 10.4 and 8.5 in whites and negroes. With the exception of *H. nana* the

AGE DISTRIBUTION OF PARASITIC INFECTIONS IN STOOLS EXAMINED FROM EASTERN OKLAHOMA

Age	Protozoa						Helminths						Pos. Sto.	Neg. Sto.	Total	Per Ct. Pos.
	E. hi	E. coli	E. nana	I. bu	C. me	G. la	N. am	A. lu	E. ve	Ta	H. na	H. di				
0- 3	—	1	1	—	1	4	—	—	—	—	—	—	5	16	21	23.8
4- 7	3	34	3	1	1	11	1	2	1	—	2	—	43	35	78	55.1
8-11	31	100	39	9	4	16	2	1	2	1	16	—	128	55	183	69.9
12-15	26	127	44	23	1	16	3	—	1	1	19	1	160	71	231	69.3
16-19	18	87	15	6	2	6	4	—	—	—	10	—	100	44	144	69.5
20 up	8	56	16	4	7	1	—	—	—	—	—	—	75	126	201	37.6
Unknown	11	33	12	1	2	9	—	—	—	—	2	—	45	21	66	—

Table 4

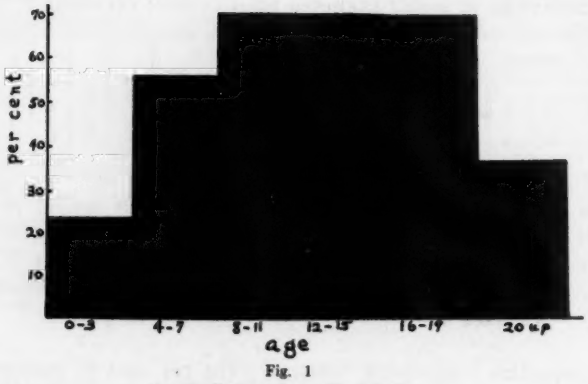

Fig. 1
Age distribution of parasitic infections.

worm infections are predominantly in Indians. In the case of *H. nana* the negroes show a 10.9 per cent infection as compared wth 3.5 and 5.1 per cent in whites and Indians. With the relatively small numbers in our series these differences are not statistically significant, but may show a trend.

Most of the samples were obtained by working through schools, so most of the individuals are from 6 to 19 years of age. Specimens were obtained from 201 individuals that were aged 20 or more and a small number were in the preschool age group. *Table 4* shows the relationship between the incidence of parasitic infections and the age of the individuals. The incidence in children from a few months to 3 years of age is low, 23.8 per cent. It rises sharply to 55.1 per cent in the 4-7 age group. Then it rises to 69.9 per cent in the next age group and maintains approximately that same level up to 19 years of age. In those 20 years of age or over the incidence drops to 37.6 per cent. This relationship is shown in *Fig. 1.*

SUMMARY

About 60 per cent of the fecal samples examined contained intestinal parasites. Few of these organisms require development outside the human body and most of them are acquired directly. Eight of the species found and about 27 per cent of the infections are capable of producing clinical symptoms. Sanitation, fly control and the treatment of individuals that are infected would be necessary for the efficient control of the parasites. The incidence is higher in the rural than in the urban population. The incidence in males and females is approximately the same. The incidence is about the same in whites and negroes, but is higher in Indians. The individuals between the ages of 8 and 19 show over 69 per cent infection and there are sharp drops in the incidence in the upper and lower age groups.

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DISCUSSION (*Abstract*)

Dr. John Y. Battenfield, Oklahoma City, Okla.—We have never felt that intestinal parasitism was a very great problem in the State of Oklahoma. Apparently we were mistaken.

The authors have shown that of approximately 1,000 stool specimens examined, slightly more than 60 per cent contained intestinal parasites, and of these about 27 per cent are pathogenic types. No statistics are given as to the percentage of these who have physical signs or symptoms of disease. Probably the percentage is not very high, but in any case it seems justifiable to say that, at least in the rural areas, a stool examination is indicated much more frequently than we have been accustomed to believe in the past. Especially is this true in elective abdominal surgery and obscure symptoms of disease referable to the gastro-intestinal tract.

The higher incidence of parasitic infection in the rural than the urban population can probably be explained by better sanitation in the cities and towns. A large part of the rural population in the area studied obtains its drinking water from shallow wells and open streams or springs.

Excreta disposal is likewise very unsatisfactory. Education of the children in the school ages to the need

of proper sanitation and personal hygiene would go a long way toward decreasing such a high incidence of intestinal parasitic infections. The authors have found the highest incidence to be in the school age group; therefore it would be logical to institute educational control measures in this group.

The need for public health education in the public schools of Oklahoma has long been felt, and within the last few months a program has been organized to bring public health education to the schools and colleges of the State. It is realized that this is only a step in the right direction, but at least it is a beginning with personnel especially trained for this work.

It would be interesting to know the social status of those examined. Doubtless a large portion of those showing intestinal parasitic infections are in the very low income group. This has been found to be true in other parts of the South, and probably applies to the area studied.

Chandler, in his text on animal parasites, states that there are many Southern families in which illiteracy and ignorance have resulted from intestinal parasitism. Social betterment and health improvement go hand in hand.

The health officer can likewise reduce the incidence of these infections by educating himself and his medical associates in their diagnosis, treatment and prevention. I do not mean to advance education as a cure-all for this or other health problems, but it does have a very prominent place. Intestinal parasitic infection is one of a group of diseases whose incidence can be greatly lowered by proper medical care after the case or carrier has been diagnosed. It seems to me that the health officer might well concern himself with advocating adequate indigent medical care where it is not available in his locality.

Dr. Henry E. Meleney, Nashville, Tenn.—A good start has been made in studying this problem in Oklahoma, and I hope it will be extended to other parts of the State.

SOME COMMON ERRORS IN DIAGNOSIS AND TREATMENT OF RECTAL DISEASE*

By EMMETT H. TERRELL, M.D.
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In presenting a strictly scientific paper on diseases of the rectum, one should limit the discussion, according to anatomists, to that part of the bowel between the sigmoid and the anal canal. In every day language, however, it has become customary to classify as disease of the rectum all abnormalities from and including the perianal skin to those which the ordinary sigmoidoscope reveals in its upper limits, probably 10 or 12 inches from the anus. This is in no sense intended to be a scientific discussion, but simply a compilation of some errors which have come under my observation. The paper, therefore, can express only my personal views, with which you may not agree entirely.

If I understand it correctly, the purpose of creating this Section on Proctology, now only three years old, was to help the practitioner or surgeon whose opportunity for study in the field of proctology has been limited. Those of us who attended college a decade or more ago received little or no instruction in diseases of the rectum. Today every medical school of importance has a department of proctology, but because of his crowded schedule the student obviously can obtain only a rudimentary knowledge of rectal pathology. In this respect, there seems no likelihood of early relief in undergraduate schools, but it cannot be expected of a young graduate that he be highly proficient in all the branches of medicine and surgery which the modern curriculum includes. Men of experience know that most knowledge is gained after graduation.

With a proper background, close observation, and study such as he is forced to give the thorax and other parts of the body, any practitioner should become proficient in the diagnosis of the more common rectal disorders. Lack of attention and failure to make examinations are responsible for many errors in diagnosis and treatment. There, unfortunately, still exists an aversion on the part of some physicians to the mere suggestion of rectal examination. These same men would consider themselves highly negligent if they failed to inspect the throat or vagina when conditions seemed to indicate it. Prescribing for a supposed ailment, while making little effort to arrive at a correct diagnosis, does not appeal to most physicians. Moreover, the patient with ordinary intelligence receiving such lack of consideration can have little confidence in his physician. The patient may ask himself, and justly so, why pay for medical service when equally good advice can be obtained at the corner drug store. An experienced proctologist, with a reputation to protect, is afraid to express an opinion based on symptoms alone and will refuse to administer treatment until examination is permitted.

It is quite natural for an individual with rectal symptoms to think only of hemorrhoids, for this is a more or less general term used by the laity to cover all complaints in the region of the rectum; as a matter of fact, there are few persons

*Chairman's Address, Section on Proctology, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

who have not hemorrhoids in one form or another, although in many instances the condition is symptomless. Hasty conclusions must not be drawn, therefore, when hemorrhoids are found. The physician must decide whether they are wholly or partly responsible for symptoms or whether another pathologic condition is present which is equally or even more important. Quite often I have seen an external hemorrhoid, possibly inflamed, removed for relief of pain when a fissure or ulcer immediately above the hemorrhoid was overlooked completely. It is, also, rather common to mistake an external thrombotic hemorrhoid for a prolapsed or strangulated internal hemorrhoid, and attempts may be made to force it into the rectum. Manipulation aggravates the pain, increases inflammation, and retards recovery.

In making a rectal examination a gloved finger should be introduced after external inspection of the parts and before passage of an instrument. Much information can be obtained through the sense of touch, but it is a mistake to depend on this means alone for the diagnosis of internal hemorrhoids. Even very large hemorrhoids ordinarily give no indication of their presence to the examining finger. Only when they are inflamed, thrombotic or fibrous can they be detected by palpation. The perfunctory and illogical manner of making rectal examinations of recruits for the army and navy is to be condemned. I have known men to be rejected because of symptomless and inoffensive skin tags and others accepted who had pronounced and active internal lesions by physicians who depended entirely upon external inspection of the parts for diagnosis.

The practice of prescribing ointments and suppositories containing opium for inflamed and painful conditions about the rectum has no scientific basis. Few medications are absorbed through unbroken skin, and opium is not a local anesthetic. When it is applied or introduced into the rectum it can relieve pain only after it has been absorbed into the blood stream. Most of the popular ointments and suppositories owe their reputation to the fact that they are used chiefly in acute, self-limiting disease. They do little more than soothe and probably never benefit the patient when important disease is present.

Since the injection of certain forms of hemorrhoids has become popular, there unfortunately are some physicians who attempt to employ this method of treatment with apparently little idea of its limitations. Contraindications have been clearly stated by many writers, and it is hard to understand why errors are committed often in this useful and not particularly difficult procedure. Now and then a patient presents himself in great distress because some sclerosing fluid has been introduced into an external hemorrhoid, enlarged papilla, or the lining of the anal canal. Such unwarranted use brings into disrepute an invaluable method of treatment. Only recently a physician referred a patient to me with the statement that although the hemorrhoids had been injected a number of times, for some unaccountable reason the patient continued to suffer severely. Examination showed an acute fissure to be the cause of the pain.

I consider it a mistake ever to subject a child to an operation for simple prolapse of the rectum before treatment by injection has been tried. For twenty years or more I have used this method exclusively, employing a 3 per cent solution of quinine and urea hydrochloride. It is a simple office procedure identical with that of injecting internal hemorrhoids. In every instance there has been complete relief and, as far as I know, no recurrence.

Unfortunately the prevalent but erroneous idea exists that the radical removal of hemorrhoids is so easy that it can be performed by the youngest intern. As a matter of fact, hemorrhoidectomy requires an exact technic equal to that of most abdominal operations, if a desirable result is to be obtained. If the truth were known, a much larger number of unsatisfactory hemorrhoidectomies than appendectomies are performed. Apparently some surgeons do not realize that when operation for hemorrhoids is undertaken it must include removal of all other associated lesions such as fissure, infected crypts and papillae. The operator must know rectal pathology and exercise good judgment in determining the amount of tissue to remove. Excision of too much or not enough tissue will be followed by unsatisfactory result. Postoperative care is also important, but is often neglected or relegated to incompetent hands.

When a rectal operation is performed, the surgeon should be able to predict rather accurately that symptoms will be relieved. Conclusions are not to be reached too quickly, but accurate interpretation must be placed on each symptom; otherwise both the surgeon and patient may be disappointed with the result. Frequently simple quiescent hemorrhoids are removed for relief of symptoms due to another cause. For example,

rectal pain of a neuralgic character associated with coccygodynia and spasm of the deep pelvic muscles, as ably described by Dr. George H. Thiele, of Kansas City, cannot be alleviated by eradication of the ordinary rectal lesions. At times excision of a fissure or hemorrhoids may be necessary as a preliminary step in the treatment of pruritus ani, but the surgeon who promises relief of itching from this procedure alone is doomed to failure. He should know that appropriate treatment must be carried on after the operation if he is to have a satisfied patient.

The physician who attends a patient for more than a few days for diarrhea without rectal examination is negligent. Many cases of diarrhea originate in the lower bowel. Not so uncommonly as is supposed, fecal impaction by its irritating effect causes frequent liquid stools as well as other distressing symptoms. It is always humiliating to the physician who has been in attendance for several days to be advised by the consultant that the patient has only a fecal impaction. This, of course, would have been detected readily had digital examination been made.

Bleeding from the rectum always demands investigation to determine its source, and sometimes this is not easy. Too much significance can be placed on the character of the blood when passed, that is, whether bright red, dark, or clotted. Clotting depends largely on the length of time the blood remains in the bowel. If it accumulates slowly in the rectal ampulla from abrasion of the walls or from an excoriated internal hemorrhoid as sometimes happens, it will pass in the form of dark or clotted blood; on the other hand, fresh blood may be evacuated after rapid and profuse hemorrhage from a remote part of the intestinal tract. Fortunately passage of blood is most often from a simple disease, but it must not be taken for granted that a serious malady is not responsible. Also, it should be kept in mind constantly that benign and malignant rectal disease may coexist. It is deplorable that many times hemorrhoidectomy has been performed when well advanced carcinoma was present only a few inches away. High examination is always indicated when there are rectal symptoms, particularly bleeding, but possibly it is wise not to attempt passage of the sigmoidoscope beyond the rectosigmoid unless one is experienced in proctoscopy. An inflamed or ulcerated bowel is fragile and easily ruptured. Perforation of the rectum into the peritoneal cavity during proctoscopic examination occurs more often than is reported.

Some physicians, when suspecting malignancy of the lower bowel, order roentgenoscopic examination, after which proctoscopic inspection is requested. The order should be reversed. If a growth is located through the instrument, biopsy can be made and the pathologic diagnosis determined. Roentgenoscopy may not be necessary then. In this connection it should be said that occasionally a malignant tumor of the sigmoid may prolapse into the ampulla and be mistaken for a growth of the rectum. If such a condition is recognized operation may be greatly simplified, and the customary colostomy and resection of the rectum avoided. This was well illustrated in a patient of mine five years ago. The growth in this case was in easy reach of the finger, but through the proctoscope it was located 8 inches from the anus. The diseased area was resected by Dr. A. Stephens Graham through an abdominal incision. Proper examination and observation saved this man from an artificial anus and the very formidable procedure of extirpation of the rectum. He has lived a normal existence since then without evidence of recurrence.

All of us, physicians included, are more or less creatures of habit and sometimes we employ measures which may not be to the best interests of our patients. One in particular is the almost universal custom of prescribing enemas with soap suds. Usually when an order for these enemas is given there is little thought of the deleterious effect that this irritating substance may have on a sensitive part of the body. Every proctologist has many records in his files which indicate that the initial rectal symptoms followed an enema of soap suds. A salt or soda water enema is fully as efficacious as one containing soap, and is not harmful.

The indiscriminate use of laxatives should, also, be condemned. The physician should consider it his duty to encourage patients inclined to constipation to avoid the use of laxatives if at all possible. Often one is surprised how quickly a sluggish and inactive bowel will respond in a cooperative patient to regulation of diet and habits. Not infrequently, however, temporary aid may be necessary in the form of mineral oil or one of the refined preparations of psyllium seed now available. Once regular evacuations are established, use of these aids may be discontinued gradually. When a laxative seems indicated, all preparations containing phenolphthalein should be avoided. This drug is irritating to the lower bowel and also to the urinary tract.

Occasionally a writer will mention hypertrophied sphincter muscles. The truth is that what is generally considered hypertrophy is actually spasm and irritability of the muscle due to infection adjacent to it. The custom of forcibly dilating these muscles as a preliminary step in rectal operation is seldom justified unless fibrous constriction is present. Stretching sufficiently to overcome spasm, except temporarily, will sever some fibers of the sphincter muscles and may permanently impair their normal contractility. If operation has taken care of all diseased tissue, spasm will disappear by the time the operative wounds are healed.

Mistakes are easily made in the diagnosis of abscess in the anorectal region, particularly in the early stages. Abscess should be strongly suspected when there is constant pain which gradually increases in intensity. Here too often, also, various ointments and suppositories are prescribed without definite indication. Inspection of the perianal skin and palpation by gloved finger in the rectum are usually sufficient to diagnose and locate an abscess soon after it has begun. Delay may be experienced, however, in definitely determining the presence of pus in the postrectal or superior pelvirectal spaces.

Drainage should be established promptly when a diagnosis of abscess has been made. The habit of applying a poultice to "scatter the abscess" or "bring it to a head," expressions often heard, is mentioned only to be condemned. In most instances incision and drainage are procedures which can be performed under local anesthesia in the office. The surgeon is indiscreet, to say the least, when he fails to inform his patient that an abscess is the first stage of a fistula and that a later operation will probably be necessary for a cure. Continuous packing, irrigation or cauterization of a draining sinus, carried out for weeks with the hope of cure are not practiced by one familiar with rectal diseases. A few days after incision of an abscess when inflammation and swelling have subsided, a fistula, if it exists, usually can be recognized. Fistulectomy, however, may be deferred for a few weeks until the abscess cavity has contracted and become walled off with fibrous tissue. In the meantime, frequent bathing of the parts and constant application of soothing ointment to prevent chafing are the only necessary treatment.

Postoperative care in fistula is of utmost importance. The amount of attention given the wound often means the difference between cure and failure. For a time many surgeons advocated excision of a fistulous tract with immediate suture. Failure to secure primary union was so common that the method now has been abandoned almost entirely. Usually it is considered best to leave the wound open to heal by granulation. Until recent years surgeons thought it necessary to keep such tracts tightly packed with gauze until healing was complete; now they advise that this practice be discarded, for continuous pressure of the gauze tends to force apart not only the wound edges, but also any muscle fibers which may have been incised. In the healing of such a wound there will be a wider and more extensive deposit of fibrous tissue which necessarily interferes with the normal function of the sphincters. Incontinence following fistulectomy is more often due to excessive scar tissue than to incised muscles.

In presenting this paper it has not been my purpose to criticize the practice of other physicians, but simply to call attention to a few common errors, as I see them, in the diagnosis and treatment of rectal disease. I take it for granted that none of us is entirely satisfied with his work. If we were, there would be no purpose in attending these meetings. All of us make mistakes, but by observation and attention to minor details these errors will grow less frequent. As we become more efficient we, also, will derive greater pleasure and satisfaction from our work. Osler has very rightly said:

"Learn to see, learn to hear, learn to feel and know that by practice alone you can become an expert."

500 Medical Arts Building

ALLERGIC CONJUNCTIVITIS*

By RALPH BOWEN, M.D., F.A.C.P.
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In reviewing the history of allergy, we find that the eye has played an important part in the evaluation of early research in the fields of tuberculosis and serum disease. In spite of this early appreciation, that ocular symptoms may be allergic, the eye is an organ which has been most obstinate in its management. This is particularly demonstrated by the various articles summarizing the treatment of allergic conjunctivitis. Many are still advocating foci of infec-

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*Read in Section on Allergy, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

tion[1] as the paramount factor, others that radium[2] treatment is the procedure of choice, and various French[3] writers insist that endocrinology explains all.

In confronting any case of conjunctivitis we should first consider non-allergic possibilities. After this, allergy may be the explanation. For a working classification I have found the following very practical.

ALLERGIC CONJUNCTIVITIS

(1) *Vernal conjunctivitis*

Types	*Factors*
(a) Corneal (limbic)	(1) Botanical
(b) Lid (palpebral)	(2) Environmental

(2) *Non-vernal conjunctivitis*

Types	*Factors*
(a) Sudden, transitory	(1) Bacterial
	(2) Drugs and cosmetics
	(3) Foods
(b) Chronic (blepharoconjunctivitis)	(4) Environmental
	(5) Pollen
	(6) Fungi

VERNAL CONJUNCTIVITIS

This group has been excellently summarized by Lehrfeld[19] as a specific form of an allergic ocular disease. Although more prevalent in the spring time in many parts of the country, I have observed that in the South it is both a spring and summer form of conjunctivitis.

The two types are namely (a) limbic, and (b) palpebral. The former is purely seasonal, while the latter may become perennial, but with an absence of symptoms during the cold season. In keeping with Lehrfeld's[19] report, I have never seen the limbic type and the lid type occur coincidentally in the same patient. The lid types are divided into:

(1) The simple follicular type.

(2) The pavement epithelium (cobblestone type).

(3) The granuloma or giant cobblestone type.

In either case the disease is characterized by itching, lacrimation, photophobia, a bloodshot appearance and a mucous discharge, often containing eosinophils. The patients of this group frequently have other allergies.

I have considered this syndrome during the past five years as nothing more than another phase of contact dermatitis. The following represents my findings in fourteen cases. In these I have tried to evaluate both the intrinsic and extrinsic components.

GROUP FACTS

All fourteen cases were typical vernal conjunctivitis. Their allergic background was 85 per cent positive. Eleven were unilateral and three were bilateral genetically. The ages varied from 4½ to 36 years. As to sex, nine were males and five females. In this group I had no negroes; however, in Lehrfeld's[19] group there were many included. Of his series the palpebral portion of the eye was never involved in the negro. I also observed that the portion of the conjunctiva most commonly involved in the chronic state of allergic conjunctivitis is the upper lid. In all the cases studied, the vision was not affected in the least by the allergic component.

Other Allergies.—It is commonly thought that cases of vernal conjunctivitis have little hay fever. However, in this group 40 per cent showed true signs and symptoms.

Food Tests.—As also observed by Tuft,[22] I did not find food a factor in a single case of vernal conjunctivitis. Various food omissions were of no benefit to the patient. However, in the non-vernal group I did find foods as offenders.

Pollen Offenders.—The majority were either of the grass, pigweed, ragweed or marsh elder group, and a few were due to tree pollen.

Antigens (Aqueous versus the Oil Factor).—All cases were originally treated with the aqueous antigen. Here the results were most discouraging. Later, I included the oil antigen which paralleled the aqueous factor by skin testing. Following this technic, the patients were materially improved.

Oil Antigen.—In each case I used both the water and the oil antigen, because I was unable to reproduce all the necessary parallel data such as we expect in contact cases. For example, all patch testing was negative. In some cases oil was instilled into the eyes with indefinite results because of the irritant character of the oil.

As for the dosage, I followed the same schedule as we do in the supervision of regular contact cases of ragweed sensitivity. I also made sure that the oil antigen was prepared by using petroleum ether.

The next question to be raised is the advisability of trying the antigen by mouth. So far I have refrained, since Dr. Shelmire reports

in his skin cases an occasional severe reaction. Also, some oil antigens by mouth have produced some severe gastro-intestinal upsets. This response may be nothing more than an intestinal contact phase.

Fungi.—All fourteen cases were tested with the various fungi. All were essentially negative. However, Feinberg[15] reports several patients who were positive on testing and were also benefited by treating with fungi.

Endocrine Factor.—Since the French writers have emphasized the endocrine aspect I made routine cholesterol and basal metabolic rate determinations. All of these cases were normal except for one case which had a minor hypothyroidism.

Local Treatment.—(1) The principle is frequent washings with cold boric solution. Then drop in the outer half of the eye some vasoconstrictor. Two practical ones are:

(A) ℞

Local anesthetic ("metycaine")	065
Sol. epinephrine chloride 1-1000	4
Boric acid (saturated) q. s.	30

(B) ℞

Solution epinephrine chloride 1-1000	4
Antipyrine	3
Boric acid	3
Distilled water q. s.	30

And occasionally estevin.

(2) Cold compresses to the eye.

(3) Silver protein antiseptics ("argyrol") should not be used in vernal conjunctivitis.

(4) In a few of the various obstinate cases radium may have to be considered. However, keep in mind that it does not cure the disease.

(5) Occasionally surgical intervention is justified.

Diseases Often Confused with Vernal Conjunctivitis.—In this group of fourteen cases, three had previously been treated for trachoma. To avoid future confusion I proposed the following key, which is a modification of Lehrfeld's[20] classification:

Non-Vernal Group.—This group, as expressed by Krückmann[4] in Woods' article,[5] has the acute and chronic phase.

"The first is the sudden, edematous type, more or less strictly localized, associated with the glassy edema of the conjunctival fold, without redness of the margins of the lid, or evidence of furunculosis or hordeolum. This is sudden in both its appearance and its disappearance. The second is blepharoconjunctivitis, associated with eczema of the lids. He also makes the point that the conjunctivitis which appears in hypersensitive persons after the injection of certain foodstuffs, notably shell fish and lentil, is indistinguishable from the conjunctivitis produced at times by atropine."

In these two types we must consider bacterial toxins or their derivatives, drugs, cosmetics, foods, environment, pollen, and fungi.

GENERAL DISCUSSION OF ETIOLOGIC FACTORS

To determine causative allergens, it is important to take a most thorough history of allergic background, diet, vocation, and avocation. Then make an allergic survey, including all antigens, as one would in the investigation of any case of hay fever or asthma. Here, it is especially important to exclude various drugs and bacterial offenders.

Pollen as a Factor.—This type is familiar to all of us during hay fever time. Congestion is usually severe, profuse lacrimation and a nonpurulent secretion without bacteria. Clinical

DIFFERENTIAL DIAGNOSIS

Trachoma	Chronic Allergic Conjunctivitis	Acute Catarrhal Conjunctivitis	Acute Contagious Conjunctivitis ("Pink Eye")
(1) Never attended by itching	Always attended by itching	Mild itching after disease has receded	Itching not characteristic
(2) No eosinophils in discharge	Eosinophils usually found	Rarely any eosinophils	Rarely any eosinophils
(3) In old cases, pannus is present or there is evidence of previous pannus	Cornea clear. Pannus never occurs	Uniform injection of upper and lower lids	Easily recognized
(4) Discharge not of "chewing gum" type	Discharge lardaceous, of "chewing gum" type	Mucopurulent discharge plus many bacteria	Koch-Weeks organisms, or any organism
(5) No history of return every spring or summer	In cases due to pollen, there is a return of symptoms regularly spring and summer	Period of inflammation short, unless complicated by corneal ulcer	Duration usually less than 2 weeks. Frequently epidemic
	Commonly associated with other allergic diseases		

benefit follows proper hyposensitization for the pollenosis, local instillation of epinephrine, or ephedrine, propadrine or another vasoconstrictor by mouth. I have found that drug tolerance can be predicted in many cases if the child is a "wet or dry sleeper."

Wet Sleepers.[6]—In taking the history of an allergic child, I always make special inquiry about the degree the child perspires while asleep. The type classified as the "wet sleeper" is the one whose forehead is beaded shortly after retiring and whose pajama neck is wet. At times the perspiration may be of such degree that one may wonder about nutritional imbalance or evidence of a disease. It is this type of child who tolerates ephedrine poorly, and may present the chain of symptoms such as irritability, headache, vomiting and insomnia. I prefer propadrine hydrochloride for the "wet sleeper" since its action is mainly peripheral, and does not have the cortical feature which is often seen after the use of ephedrine.

I do not wish to convey the impression that the above is to be taken dogmatically, but clinically the simple division of children into the groups of "wet" and "dry" sleepers has been a practical guide in the prescribing of ephedrine and epinephrine. I believe this excessive perspiration signifies an imbalance between the two nervous systems.

Drugs and Cosmetics.—In this type there is usually a marked zone about the eye which is also swollen and erythematous. The lids are frequently eczematous and edematous. Confirmation of the offending drug can frequently be demonstrated by patch testing. One must keep in mind that the test should be placed as near the affected part as possible. Also, remember that after the offender is withdrawn, areas of irritation may persist for days.

Woods,[5] in summarizing Landsteiner,[7] says:

> "Simple inert substances, even metals, may combine with native protein to form sensitizing substances. This is probably the explanation for the development of hypersensitivity to drugs by the conjunctiva. The offending drug, in contact with the lacrimal secretion, forms a foreign compound capable of producing specific sensitization."

These cases are frequently seen in patients who try for the first time a new cosmetic, a local ointment for dermatologic reasons, and also where cocaine or another local anesthetic ("butyn") is used in the eye. Occasionally an upset may occur from intravaginal medication following the use of picric acid or quinine. In such offenders one cannot be satisfied with the simple question, "Do you use any drugs?" Instead, you must start with the scalp and make careful inquiry as to all medications. Continue in this manner for all systems in the body. Make very careful inquiry as to what is used for scalp treatments at the beauty parlor or barber shop. Make special inquiry as to what is in the patient's medicine cabinet. In fact, all such cases justify a physician's personal survey of the patient's home.

Bacterial Factors.—The assignment of ocular sensitivity to a particular portion of the mosaic of bacterial antigens is still a matter of controversy.

At the Wilmer Ophthalmological Institute[5] in fifty cases showing staphylococci as the chief offender, a staphylococcus toxin was used. In these fifty cases brilliant results were attained. The cutaneous sensitivity was determined by the intracutaneous injection of 0.1 c. c. of a 1:100 dilution of the toxin. The normal reaction is from 3 to 4 cm. in diameter. Otherwise a strength of 1:1000 or a 1:10 is used, depending on the response to 1:100. In the event a 1:100 can be used the initial dosage is 0.1 c. c. A four day schedule is then followed. As a general rule 4 to 10 injections are sufficient. Then the dilution of the toxin is concentrated ten times, the concentration being increased from 1:1000 to 1:100 or from 1:100 to 1:10,

Fig. 1
Typical cobblestone lesions seen in vernal catarrh. (Shown through courtesy of Dr. Warrick J. Thomas, Cleveland, Ohio.)

and 0.1 c. c. of this stronger concentration is given until again a minimal reaction is obtained. This is continued until the patient can tolerate 0.1 c. c. of pure toxin with a minimum reaction. Occasionally there will be transitory ocular flare-ups following this schedule.

In a recent letter, Dr. Woods[8] says:

"The staphylococcus toxin used is one prepared from the virulent strain of hemolytic Staphylococcus aureus isolated here some years ago which returned the HA strain. I believe the toxin gives better results than does the toxoid, which is the detoxified toxin. The toxin, however, can be obtained commercially."

Streptococcus Toxin.—The evidence for this group as confirmed by Swift[9] is that for streptococci we should depend on vaccine therapy with the killed organisms. He also demonstrated that intracutaneous injection of killed streptococci tends to sensitize rabbits, and that intravenous injections of the organisms produce an immunity. In this case they usually gave 0.5 c. c. containing approximately 5,000,000 heat-killed organisms. Always keep in mind the possibility of a systemic reaction. Unlike the staphylococcus, the therapeutic principle in streptococci requires that the material be administered intravenously.

"Vaccine therapy, based solely on cutaneous reactivity to bacteria, in the present state of knowledge, is to my mind unjustifiable and scientifically indefensible. In the normal course of life any average human being is bound to become hypersensitive and show a cutaneous reactivity to a host of common bacteria to which he is constantly exposed. Many investigators have shown that the greater percentage not only of diseased persons, but of normal persons, have a cutaneous sensitivity to common organisms, such as streptococci and their derivatives.

"If one accepts such cutaneous reactivity as a criterion for vaccine therapy, there is no disease in the whole gamut of pathological conditions of man which should not be so treated.

"The patient has no chance of escape. Further, it is not clearly shown whether the vaccine should be prepared from the bacterial bodies or from the filtrates. In the case of staphylococci, as it has already been pointed out, all the evidence indicates that the maximum protective effect is obtained by a properly prepared filtrate of toxin, while in the case of streptococci the present indicators are for the use of vaccine prepared from the bacterial bodies. In ocular conditions there appears to be little justification for the use of vaccine prepared from the intestinal flora. Certain cases justify specific vaccine therapy. But in the main there is a tendency for its too promiscuous use as a therapeutic agent and not enough allergy exclusion."

The above is proffered by Dr. Woods.[5]

A recent article by Thomas and Warren,[10] in a review of thirty cases of allergic conjunctivitis, reported that 50 per cent gave a very strong reaction to stock vaccines consisting of vaccines made from nine different varieties of organisms. They made no interpretation, but recorded this observation.

Food as a Factor.—As formerly stated, I have never seen food as a factor in any case of vernal conjunctivitis. However, it can be of much significance in the acute and chronic non-vernal group. Often the offending food may exist where least expected. For a few examples, ground beef may have had tomato juice added by the butcher to give it that fresh appearance of redness. The tuna fish may cause an allergic upset because of the fact that cottonseed oil is used in packing. Certain brands of catsup contain in addition to tomato, spices and onion, given amounts of seafoods and walnuts. Our morning breakfast roll may be covered with ground soy bean, which you may believe is ground nuts. One must also keep in mind that grape sensitive cases may be affected by the cream of tartar in angel food cake. Last, but not least, the "lowly noodle"[11] has followed camouflaging. In the past, it has been blamed for its egg or wheat content. Now certain brands contain no egg, but for a golden coloring contain a coal tar derivative (naphthal yellow S.). This would be particularly troublesome to one who is known to be aspirin sensitive. At present there are now fifteen coal tar dyes which have been approved by the Food and Drug Administration for use in foodstuffs.[12]

Environment.—In all cases of allergic conjunctivitis it is an advantage, irrespective of positive skin tests, to advise hypo-allergenic cosmetics. Insist that everyone change to these, including wife, maid and husband. Also, insist that old powder puffs and purses be discarded, because they contain too much of the cosmetic which was the original offender. Cover all pillows with an adequate pillow casing, such as Egyptian cloth or rubberized silk, for in so doing the inhalant factor will be minimized. Discourage an active interest in gardening. Remember the insecticide may be a frequent and innocent irritation because of the fact that the majority contain a pyrethrum base. A new insecticide contains a derivative of castor bean. For cases sensitive to pyrethrum two good substitutes are "Killit" and "Cedarene." Discourage pets from the home. Also, keep in mind that certain hobbies may be trouble makers. Particularly this is true of model airplane making, because of the exposure to various glues which are usually from a fish source, while the glue on postage stamps is of vegetable origin.

ALLERGIC CONJUNCTIVITIS DUE TO HAIR OIL

The fact that a specific sensitization to orris root may cause acute conjunctivitis is common knowledge, and that it may be the cause of chronic conjunctivitis of the so-called vernal type is illustrated by the following case:

C. M., a boy, aged 9 years, was brought to the office to determine the cause of chronic conjunctivitis of two years' standing. Irrespective of intensive and good medical care, this boy's eyes itched, were markedly reddened, and at night frequently showed edema of the lids. Allergic review was advised because many members on the paternal side of the family had migraine.

Physical examination was essentially normal except for bilateral conjunctival redness, injection of scleral vessels and some edema of the lids. Smears from the eyes contained no bacteria, but there were many eosinophils.

Except for a major reaction to orris root, test findings were negative. On further inquiry, the father admitted that during the past two years considerable hair oil had been used on the patient's hair, since it was of a wiry, bushy type. Orris root from cosmetics could be only a minor factor, since there were no women in the home except his grandmother, and she used none.

I advised discontinuation of hair oil, and within forty-eight hours he was 75 per cent improved, and within thirty days his eyes were normal. Nearly two years have elapsed and the child is still free of all symptoms.

ALLERGIC CONJUNCTIVITIS DUE TO CAMPHOR BALLS

Mrs. F. W., aged 23 years, reported to my office one day in August of this year, and complained of a typical case of allergic conjunctivitis of two years' standing. Prior to coming to Houston this patient had lived in New York City. For a period of two years intensive investigation and therapy had been supervised by various clinics, but to no avail.

This patient for the first time in two years experienced relief when she and her husband left New York City for Houston by way of St. Louis. This improvement occurred when she was but two days out from New York. On arriving at St. Louis she was completely well. The following evening she decided to attend the outdoor opera. It was cool that evening, so she wore a woolen sweater. Within a few hours all of her old trouble returned acutely. This difficulty persisted until she reached Houston. Before coming to see me this patient had gone to the sea coast twice, and on both occasions she was unable to swim because of her eye condition. Instead she knitted. Each time after returning from the coast her eye trouble became more acute.

With this history of a flare-up after wearing a woolen sweater to the outdoor opera, and also following two knitting experiences, one would be led to suspect wool as the offender. All allergic tests, including wool, were negative. I then investigated the home, and there was the answer. Packed in her knitting yarn and woolen garments were numerous camphor balls. Complete exclusion of these and a thorough laundering has afforded the patient 100 per cent relief.

Fungi.—Although I failed to find fungi responsible in the vernal conjunctivitis group, recent reports by Rinkel,[14] Feinberg,[15] Thomas,[16] Figley,[17] Simon[18] and Stroud[21] show that it is an important factor in the non-vernal conjunctivitis group.

CONCLUSIONS

(1) Allergic conjunctivitis may be of two types: the vernal and non-vernal. The factors for the former are botanical and environmental, and food is never an offender.

(2) Vernal conjunctivitis is a form of contact dermatitis. Its treatment is expedited by using both the water and fat soluble antigen.

(3) The non-vernal type may be the result of cosmetics, drugs, bacteria, foods, environment, pollen and fungi.

(4) This problem can best be approached by a close cooperation of the ophthalmologist and allergist.

(5) The practical management of either type at times does not end with an office survey, history taking and allergic testing, but it is paramount that the physician personally visit the patient's home and place of employment.

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DISCUSSION (*Abstract*)

Dr. C. Malone Stroud, St. Louis, Mo.—I have had two failures in cases of this type since I received Dr. Bowen's paper, and they came about in this way: one

was a mistake in diagnosis and the other was an improper consideration of the probable offending factor.

In one of our cases, the eye lesion was apparently due to acne rosacea, and treatment of that resulted in prompt disappearance of the conjunctivitis. This is a complicated subject.

The treatment of allergic dermatitis should be done with the dermatologist, and treatment of this condition should be done with an ophthalmologist.

A number of my cases have responded well who have shown reactions to fungus extracts.

Dr. Bowen called my attention several years ago to his use of resinous and aqueous extracts in the treatment of vernal conjunctivitis. Whereas I formerly had about 100 per cent failure in the treatment of vernal conjunctivitis, I have found that some cases can be managed by the use of the resins or oleoresins of the plants involved.

Dr. J. Warrick Thomas, Cleveland, O.—I entirely agree with Dr. Bowen that the problem of allergic conjunctivitis should be approached by the allergist and the ophthalmologist together.

In a series of thirty-odd cases which I studied, each patient with few exceptions was seen by Dr. A. D. Ruedemann, of the Cleveland Clinic Department of Ophthalmology, and only by close cooperation with him was I able to obtain satisfactory results.

In many instances, Dr. Ruedemann referred patients to me in whom there were no other manifestations of allergy. In this group, it was questionable whether there was a definite allergic basis for the conjunctivitis; however, a program of allergy management was instituted since all previous ophthalmologic treatment had failed.

In the cases presented by Dr. Bowen, the age of the patients did not extend beyond 30 years. In my series of cases, the age of the patients extended to 65 years. That fact may have some bearing upon the role played by bacterial vaccines, since the series included a number of elderly individuals.

As far as foods are concerned, I feel reasonably sure that the patient presented upon the screen was a case of allergic conjunctivitis caused by foods, since he was relieved by the elimination of wheat from his diet, and experienced symptoms following the ingestion of bread.

I have had positive patch tests in a number of cases, usually those of a chemical nature in which there was a contact with pontocaine, procaine or phenacaine.

Many of these patients present a mild conjunctivitis which may be explained by allergy. They have been treated indiscriminately by physicians with various ophthalmic ointments to which they may be sensitive. Following the use of the ointments, a definite flare-up of symptoms may progress to a definite contact dermatitis around the eyes.

I shall mention only briefly the question of fungi and bacteria. In the series which I studied, both fungi and bacteria were implicated, since we were able to reproduce the patient's symptoms with overdosage of fungi extracts and autogenous or stock bacterial vaccines, depending upon the material used. Such extracts and vaccines have a place in this type of treatment if they are carefully administered.

Rather than using an extract from a single inhalant, a combination of the inhalants, as well as epidermals and molds, is preferable. We use stock or autogenous vaccines in the program of treatment whenever indicated.

The best results from treatment are secured by the close cooperation of the allergist and the ophthalmologist.

I happened to have a case of conjunctivitis which showed a sensitivity to dog hair along with fungi and bacteria.

Dr. Leon Unger, Chicago, Ill.—We must be very careful to distinguish the two groups of allergic conjunctivitis, the seasonal and the non-seasonal. They are very different. We have all seen patients with contact dermatitis in the eyelids due to various substances, for example, butyn or quinine; and other cases due to inhalation of feathers or orris root.

I do not believe that we can as yet accept allergy as the main cause of seasonal vernal catarrh, despite the work of Lehrfeld and others. Other men do not agree with Lehrfeld's conclusions.

There has as yet been no definite correlation between pollen, for example, and vernal catarrh. The seasons do not fit. When the pollen of grasses is in the air, vernal catarrh does not necessarily begin. It comes with hot weather and its symptoms do not agree with pollen counts. It does not seem to fit in with mold counts, either; therefore, I do not think that we have proven that vernal catarrh is necessarily allergic.

It is known, of course, that many patients with vernal catarrh also have true hay fever. These individuals give positive tests to pollens, but hay fever is one thing and vernal catarrh is another. Many cases of vernal catarrh give negative skin tests and yet their symptoms come on year after year with hot weather.

Occasionally a patient with vernal catarrh may develop a severe inflammation of the eye. He should have the benefit of specially made goggles and of air filters if he happens to be also sensitive to pollens. I have seen some very nasty ulcers which led to opacities in the cornea, with resultant blindness or partial blindness. If these patients have goggles and air filters so that pollen cannot get at the eye, they are less likely to have complications.

I have had personal experience with vernal catarrh which I cannot correlate with allergy. I had it myself for three summers. It started in June and disappeared entirely at the end of the third summer. That was about twenty years ago. Hay fever does not disappear like that, at least until old age.

Dr. Alan Cazort, Little Rock, Ark.—I should not discuss this paper but will, because I feel that we have little evidence that conjunctivitis occurring alone usually is allergic. We all see cases which we believe to be allergic and treat them on this basis; sometimes successfully, but more often not. I certainly do not think evidence has been presented, nor have I recognized clin-

ical evidence, if it exists, that conjunctivitis is comparable to contact dermatitis. The experimental work we saw yesterday would indicate that oil antigens affect the mucous membranes little if at all. We should not expect the eye to react.

One case shown seems also to have contact dermatitis about the eyes. We see conjunctivitis associated with contact dermatitis. I have usually found the latter due to medication applied for the conjunctivitis. It is probable also that the patient with itchy eyes carries many antigenic substances to the lids with his hands, rubbing the eyes.

Dr. Bowen says that the patients do not react to the suspected offenders by patch tests, which is not the case in contact dermatitis.

As to the matter of effective treatment, injections of milk and of bacterial protein or any other agent producing a good local reaction frequently are beneficial. I suppose castor oil would relieve some.

Dr. George L. Waldbott, Detroit, Mich.—Several years ago I reviewed the records of twenty-eight patients with allergic conjunctivitis. A few interesting points were noted in this investigation. That contact is a very important factor in producing this condition was ably brought out by Dr. Bowen. This undoubtedly has been somewhat neglected in the literature. Soaps, drugs, hair setting fluids, hair nets, eyelash dyes and other cosmetics, in short, anything causing contact dermatitis is also liable to cause contact conjunctivitis. In these cases, intradermal skin tests must necessarily be negative.

In about eight or ten of my patients the conjunctivitis initiated a more or less chronic allergic situation, involving nose and lungs as well. I therefore feel that we should consider the presence of allergic conjunctivitis as a warning signal that our patient may later develop other allergic diseases.

The fact that a patient with vernal catarrh gives negative skin reactions to pollen and fungi which are in season at the time should not make us refrain from giving proper desensitization treatment with these antigens. With pollen as well as fungi I have obtained very satisfactory results, provided that the treatment was built up to sufficiently high doses. The oil extracts which I, too, had employed for some time were not so effective as regular extracts.

Dr. Bowen (closing).—As was brought out by Dr. Thomas, this problem is one which should always be shared jointly by the ophthalmologist and the allergist.

The 14 cases I presented were all reviewed by an ophthalmologist. In this group our good clinical results were materially increased after considering the syndrome of vernal conjunctivitis as another phase of contact dermatitis.

Dr. Unger says that pollen is not the etiologic offender in vernal conjunctivitis; yet he admits that such patients are benefited if they will wear goggle-like glasses. To me this is in itself an admission of the extrinsic factor. Clinically, I am convinced that pollens are one of the main offenders.

In any case with a conjunctivitis, be it acute or chronic, may I again urge that we first rule out the organic possibilities. Last, but not least, do not forget allergy.

PRURITUS ANI ET VULVAE: A SYMPTOM OF ECZEMA*

FURTHER OBSERVATIONS AND REPORT OF 61 ADDITIONAL CASES

By HOWARD HAILEY, M.D.
Atlanta, Georgia

In a recent paper† on this subject 139 cases were reported. This paper is in the nature of a second report and brings the number of cases of pruritus ani and pruritus ani et vulvae to a total of 200. A comprehensive review of the literature was made prior to the first paper, which carries the bibliography. It is suggested that those interested in this subject read the first paper by Dr. Hugh Hailey and myself. In this paper we projected the idea that pruritus ani et vulvae was a symptom of eczema of the anus and vulva. We stated there were two causes for eczema, namely: an indirect cause which is furnished through heredity, and a direct or exciting cause which may be an external or internal excitant. The exciting causes have been previously enumerated. I believe that the emotions under certain conditions may and do excite attacks of eczema as well as asthma, hay fever and urticaria.

This recent and heretofore unreported group of 61 cases emphasizes and substantiates our claims in the first paper. I now believe that cystitis in many patients is a manifestation of hypersensitiveness‡ and should be added to the previous list which included hay fever, asthma, eczema, urticaria, migraine, arthritis, sinusitis and pyelitis. All of these conditions are too prevalent in patients with eczema of the anus and vulva to be merely coincidental. These hypersensitive patients are not cured following removal of suspected foci of infection. One must not assume that all cases of pyelitis and cystitis are of infectious origin because pus cells and bacteria are present. Instrumentation of these hypersensitive patients is contraindicated. Most of the common bacteria at some time can be cultured from open eczema lesions as well as from the swollen lining mucous membrane of the sinuses and internal organs. The internists are con-

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*Chairman's Address, Section on Dermatology and Syphilology, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

*From Emory University School of Medicine.

†Hailey, Howard; and Hailey, Hugh: Pruritus Ani Et Vulvae. Arch. Dermat. & Syphilol., **40**:726-741 (Nov.) 1939.

‡"Manifestations of hypersensitiveness" or hypersensitive manifestations, are synonymous and preferred by the author to "allergic reactions."

stantly identifying syndromes of the internal organs and joints as hypersensitive manifestations which heretofore were believed to be due to infection or some other cause.

The hypersensitive individual furnishes the various clinical pictures of drug reactions. In recent months I have seen seven cases of argyria. A strongly positive family history for hypersensitive manifestations was obtained from the family of each patient with argyria.

I believe that all physicians should give more attention to the family history before advising an operation or prescribing any drug which commonly produces untoward reactions. What has become of the "status lymphaticus" explanation of sudden death following local and general anesthesias and accompanying surgical procedures?

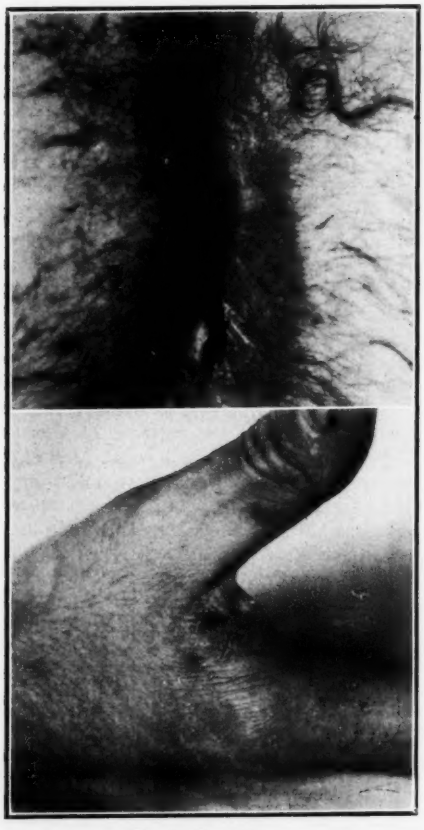

Fig. 1, Case 29

Male, aged 27, had eczema of anus, scrotum, ears and both hands of several years' duration. Patient had colitis, which was diagnosed as allergic before coming under our care. Mother and sister have bronchitis.

We have seen an unusually large number of patients during the past year who had an acute dermatitis from the dye in new rayon dresses and various items of wearing apparel containing rubber. Invariably, we have found these people to be suffering from one or more of the enumerated hypersensitive manifestations or that they had a strongly positive family history for the conditions.

To illustrate, in my mind comes the picture of a young woman who has hay fever, urticaria and eczema. She consulted me for an acute dermatitis of the axillae. The patch test with rubber from a well-known dress shield gave a strongly positive reaction. Vitiligo followed the disappearance of the dermatitis. In six weeks she returned with an acute dermatitis confined to a 4-inch band encircling the body. This was proven to be due

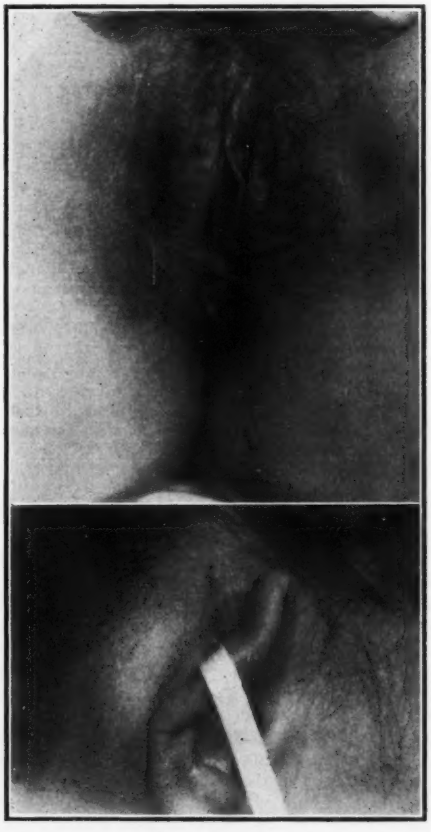

Fig. 2, Case 40

Female, aged 21, had eczema of anus, vulva and both ears of nine months' duration. On the maternal side her mother and grandmother had sinus trouble; grandfather and uncle had migraine; aunt had hay fever; first cousin had pyelitis. On the paternal side her father had psoriasis; half sister had hay fever.

to the rubber in a new pair of pants. Before she had fully recovered from the dermatitis due to the rubber she returned with a new but narrower band of dermatitis about the body and just below the subsiding 4-inch band of dermatitis, which resulted from the rubber elastic guard belt.

I am attempting to emphasize the importance of the history of hypersensitiveness, for it is these persons who have eczema of the anus and vulva as well as other parts of the body. We stated in the first paper that we believed, if reliable histories could be obtained in every case, that the percentage of patients with positive histories of hypersensitive manifestations would approximate 100. In our first group of 105 patients the percentage of "positives" was 60. In the second group of 34 patients the percentage of "positives" was 62. In the group being reported today 49 of the 61 patients, or 80.32 per cent, were positive. This large increase in the percentage of "positives" has been due to more perseverance on our part in contacting relatives and insisting that the patient communicate with relatives in an effort to obtain the information we desired. It was surprising to see the number of returned cards showing several instances of hypersensitive manifestations in the patient's family, although he had insisted during his first visit to the office that none of his people had "those troubles."

In this group of 61 white patients with pruritus ani et vulvae the duration of the complaint was from three months to ten years. Some patients reported repeated attacks with periods of freedom from itching, with or without treatment, which would last weeks to months. Others reported that the itching was continuous. Every experienced dermatologist knows that frequently eczema spontaneously disappears and may or may not reappear in that particular area. The youngest patient in this group was 6 months old while the oldest was 80 years of age. Several patients reported that they had been operated upon. The most frequent operation was hemorrhoidectomy. Next in order of frequency was the operation for removal of crypts and papillae. Permanent relief did not follow in a single instance. In two patients there was no pruritus until after hemorrhoidectomy. One patient reported pruritus which had been persistent since an operation six years before. She had eczema elsewhere and a positive history for hypersensitive manifestations. Proctologic operations are needed and should be done when indicated, but we strongly believe that those patients who have been operated upon for eczema (pruritus ani) if followed for a sufficiently long time will prove to be disappointing to the operator. The patient does not obtain permanent relief from the itching.

In this group of 61 patients, 27 are males and 34 females. There are: 6 cases of pruritus ani only in females; 8 cases of pruritus vulvae and 20 cases of pruritus ani et vulvae. Eight patients have asthma and 6 of the 8 also have hay

Fig. 3, Case 48

Male, aged 28, had eczema of the anus (four months' duration), penis, face and ears (12 years' duration). He also had hay fever. His father and mother died when he was an infant. He did not know any of his relatives; therefore, his family history for manifestations of hypersensitiveness cannot be accurately reported.

fever. Eighteen of the 61 patients have hay fever. This number includes the 6 who also have asthma. Twenty-nine and five-tenths per cent of this group of patients with pruritus ani and pruritus ani et vulvae also have hay fever. This frequency appears to be too often for acceptance as a coincidence. All 18 hay fever patients have eczema elsewhere on the body other than the anus or vulva. Seventeen of the 18 hay fever patients have a positive family history for hypersensitive manifestations. A patient, represented in *Case 6*, does not know any of his relatives. Eighty-six and eighty-eight hundredths per cent of the 61 patients have eczema elsewhere; 80.32 per cent of the 61 patients have a positive history for one or more, usually several, manifestations of hypersensitiveness in one or more, usually several, immediate blood relations.

I now wish to present evidence in support of my beliefs concerning pruritus ani et vulvae in the following abstracted case histories.

Case 1.—A boy, aged 12, had eczema of the perianal region and upper lip. He also had eczema and hay fever. His paternal grandfather had eczema and paternal aunt had asthma.

Case 2.—A woman, aged 32, had eczema of vulva, perianal region, buttocks, ears and scalp. Her mother had eczema and migraine. Her boy, aged 1, had had eczema since he was 6 weeks old. She did not know her grandparents. Her history showed that pruritus of the vulva and perianal region began two years previously, shortly before pregnancy. Her obstetrician told her that he believed the itching would disappear after the birth of her baby. After delivery the pruritus persisted and she was referred to a gynecologist, who treated her three months for an "infection" which he

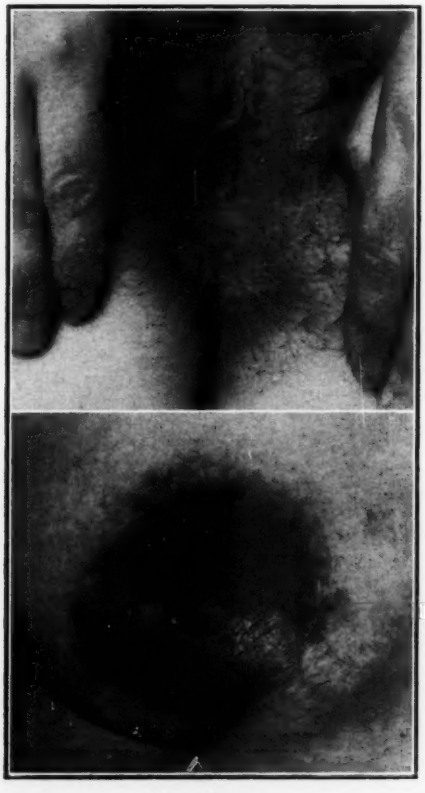

Fig. 4, Case 50

Female, aged 34, had eczema of the anus, vulva, breast, face and ears of one year's duration. She awakened five to six times during the night because of a desire to void, which she has done for two or three years. On the maternal side her mother had cystitis, pyelitis, arthritis and migraine; her grandmother had migraine. On the paternal side her father had eczema; sister and niece had eczema; and her grandfather and uncle had asthma.

Fig. 5, Case 61

Female, aged 51, had eczema of the vulva, groins, perianal region, abdomen, inframammary regions, ears (15 years' duration), arms and palms (4 months' duration). She also had hay fever and asthma. Her mother had had migraine for years; two sisters had hay fever; her daughter had hay fever.

told her caused the itching. She went to a second gynecologist and later to a dermatologist, who advised that her trouble was due to diet and suggested that she see a gynecologist. She elected to see a second dermatologist.

Case 3.—A woman, aged 50, had eczema of the vulva and eyelids. She had never consulted a physician. She had had many attacks of pyelitis and cystitis, the cause of which had never been discovered. Her daughter had asthma and hay fever.

Case 4.—A woman, aged 37, had had eczema of the perianal region for six years. Shortly after operation for hemorrhoids and fistula the trouble began. She had also had hay fever for twelve years. Two maternal uncles and aunts had migraine. Her paternal grandmother had arthritis. She was relieved of the pruritus and dismissed four weeks later as clinically well following treatment for eczema. Thirteen months later she returned to the office with an acute attack of eczema of the eyelids and chin. She said that she had had two previous attacks of eczema of the eyelids, but that she had not had any trouble with eczema of the perianal region (pruritus ani).

Case 5.—A woman, aged 53, came to the office because of a dry, infiltrated patch of eczema 10 centimeters in diameter near the left elbow. It was the dry type of eczema known as lichen simplex or neurodermatitis. The patch had been present for ten months. She was asked if she had ever had itching of the vulva. Her answer: "Lord, yes, but I went to the doctor and he assured me nothing was wrong." Examination revealed on two-thirds of the length of the right side of the vulva and lower pubic region a discolored patch which was markedly infiltrated. She placed her finger on the area and said: "Doctor, I have been itching there off and on for more than a year." This patient had had asthma since the age of 16. She also had hay fever. Her brother had sinus trouble. Her half-aunt on maternal side had asthma. The father had arthritis.

Case 6.—A man, aged 25, had moist eczema of the perianal region. Multiple abrasions and fissures were present which had resulted from trauma produced by scratching in an effort to get relief from the pruritus. He also had hay fever. He was an only child whose parents died while he was very young and he did not know any of his relatives. This case points out the fact that while this history of manifestations of hypersensitiveness must be reported as negative in the parents or immediate blood relations, it cannot be considered to be an accurate history. This history and similar ones illustrate why we are unable to report that 100 per cent of the cases of eczema of the anus and vulva have a positive family history for manifestations of hypersensitiveness.

Judicious treatment of eczema of the anus and vulva will cure the immediate attack and relieve the pruritus which is the only symptom that forces the patient to seek medical attention. X-rays are our most valuable single agent in combating eczema. They must be used cautiously and should be administered only by those experienced in the treatment of diseases of the skin. Those who attempt to treat eczema by use of x-rays alone will meet only with disappointment. After the patient has recovered from an attack of eczema he should be given an outline of the routine he should follow in order to discourage recurrent attacks and shorten their duration.

Unless a halt comes to intermarriage of members of families with hypersensitive manifestations, almost everyone in a few generations will have inherited a predisposition to eczema or one or more of the other hypersensitive manifestations. Then medicine will be largely a profession occupied in the alleviation of hypersensitive manifestations. No one can boast of permanent cures. Cures often happen, but most frequently they cannot be satisfactorily explained. The subject of the "cure" of the various manifestations of hypersensitiveness has been attacked, I believe, from the wrong angle. Individuals of marriageable age who are considering marriage, if they are from families with records of frequent cases of hypersensitive manifestations, even though they have none of the manifestations of hypersensitiveness at the time, should not marry into families of similar records. It is because of this hereditary factor, or direct cause, that I believe the solution is a biologic one.

Our dream is to select a sufficiently large number of families with positive histories of manifestations of hypersensitiveness, and to attempt to establish worth-while records on each individual. The individuals are to be told to select mates with negative family histories for manifestations of hypersensitiveness. Records then should be kept of their offspring. We believe that in five to ten generations the maladies known as manifestations of hypersensitiveness would thus be eliminated. This sounds utopian, but I firmly believe in it.

With the aid of an interested university or foundation and a group of intelligent families whose members were affected, this experiment would not be an insurmountable task.

SUMMARY AND CONCLUSION

This report substantiates the claims of our first paper on this subject, namely: (1) pruritus ani et vulvae, when persistent with or without remissions, is a symptom of eczema of the anus and vulva and not a clinical entity. (2) The presence of eczema elsewhere, other than on the vulva or anus, together with a positive history of one or more manifestations of hypersensitiveness in one or more immediate blood relations, is confirmatory evidence that the patient with

pruritus ani, pruritus vulvae or pruritus ani et vulvae has eczema of those anatomical locations. (3) The causes of eczema of the anus and vulva are the same as those of eczema elsewhere: the indirect cause which is biologic and is furnished through heredity, while the direct cause may be an excitant of external or internal origin. These have been enumerated in the previous paper. The emotions, though not specifically mentioned in the previous paper, we recognize as excitants of attacks or as a factor causing relapse or prolonging attacks.

Manifestations of hypersensitiveness may appear in epithelial tissue anywhere within or without the body.

The solution of the problem of hypersensitive manifestations, so far as a permanent cure of these conditions is concerned, is biologic. Those who are affected should marry into families free from the conditions.

Eczema of all other body openings is generally recognized as such, and fanciful causes are not listed as etiologic for eczema of the auditory canals, nares, perioral region and the margin of the eyelids. Operations and the use of glasses do not cure eczema of the other body openings and the margin of the eyelids.

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POSTERIOR VAGINAL HERNIA*

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There is nothing new about posterior vaginal hernias. They have been recognized since Garengeot described the condition in 1736. But since nearly half of them are diagnosed only after the individual has been operated upon unsuccessfully from one to three times, it would seem that it is almost as easy to overlook them today as it was two hundred years ago.

The purpose of this paper is to review the literature and the reported cases during the past ten years, to report three additional cases, but more especially to emphasize again that such a condition can and does exist. For it is only by keeping this possibility in mind that we shall diagnose them and treat them successfully.

A perineal hernia may emerge from any part of the floor of the pelvis and appear in any part of the perineum. A posterior vaginal hernia emerges from the floor of Douglas' pouch and descends between the layers of the rectovaginal septum to appear beneath the posterior vaginal wall. According to Bueermann, this type constitutes 74 per cent of all perineal hernias (*Fig. 1*).

The posterior vaginal hernias are often incorrectly diagnosed. They are frequently thought to be simple rectoceles. Because they are readily mistaken for a common clinical entity they deserve special emphasis. For unless such a hernia, when present, is recognized and its sac obliterated, no operation for rectocele or prolapse will relieve the patient of her symptoms. Failure correctly to treat a coexisting posterior vaginal hernia undoubtedly accounts for some of the poor results that occasionally follow operations for the relief of pelvic or genital prolapse. Not all of the blame for such failures can be put on "poor healing" or "thin tissues." To repair a prolapsed rectum and fail to find and obliterate a hernial sac projecting downward from the pouch of Douglas is just as certain to result in a recurrence as to overlap and strengthen the abdominal wall in a case of inguinal hernia and leave the sac undisturbed.

Cases are recorded in which failure to recognize vaginal hernias resulted fatally. Gunz[2] reports two such cases. In one, the hernial sac was mistaken for a cyst and aspiration resulted in peritonitis and death. In the other, the hernial sac was thought to be a polyp. But, after excision, this supposed polyp was found to contain a portion of the transverse colon and omentum. Thomas records a case in which the hernia was mistaken for an abscess. Bueermann[1] also reports from the literature two cases in which the sac ruptured with evisceration and death, and a case in which death occurred from incarceration. Huet[3] describes a case in which a fall astride a trestle resulted in rupture of the intestine contained within the hernial sac, resulting in a fatal peritonitis. It is readily appreciated that an unsuspected hernia may greatly enlarge under the straining of labor and offer a real difficulty and danger in delivery.

Such isolated catastrophes are of scientific interest. But it is the ease with which such a hernia may be overlooked, or mistaken for a rectocele, that places it in the realm of practicality.

Potthast,[7] Richardson[8] and others have em-

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*Read in Section on Surgery, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

phasized the necessity of obliterating an unusually deep *cul-de-sac* occasionally encountered in gynecologic procedures. But the existence of an actual posterior vaginal hernia is seldom referred to. The textbooks on gynecology either ignore the condition entirely or dismiss it with one or two lines, the one notable exception being Ward's very graphic description appearing in Kelly's "Gynecology."

A careful review of the literature covering the past ten years reveals only 42 cases reported in sufficient detail definitely to classify them as of the posterior vaginal variety. Such a scarcity of recorded cases is probably due to one of two causes: either the sagging of Douglas' pouch is considered simply a part of the general pelvic prolapse and unworthy of special mention, or the condition is overlooked and not recognized as a true hernia and not treated as such.

The author wishes to report three additional cases:

Case 1.—(*Fig. 2.*) Mrs. R., 60 years of age, presented herself in October, 1937, complaining of vaginal protrusion. After the birth of her second and last child she developed a vaginal protrusion which had gradually become worse. Eighteen months previously she had undergone a ventral suspension of the uterus and a perineorrhaphy. Shortly after her discharge from the hospital, however, the vaginal protrusion recurred and was a source of constant discomfort.

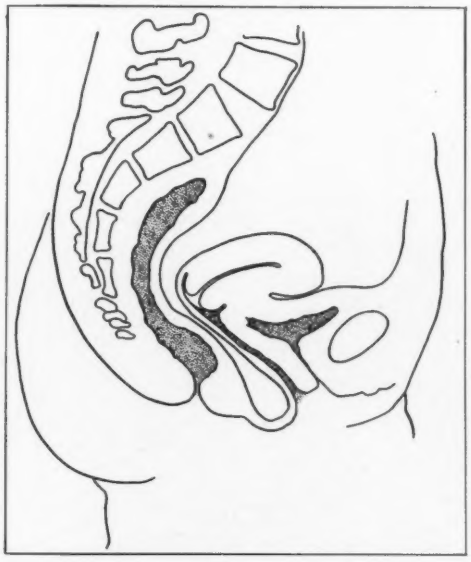

Fig. 1
Peritoneal protrusion extending downward from Douglas' pouch to form a posterior vaginal hernia.

Following this postoperative recurrence various pessaries were tried in an effort to support the protrusion. Although these pessaries seemed to remain in place, the protrusion would slip beneath the pessary and make its appearance beyond the introitus.

Examination disclosed the lower abdominal scar of the previous uterine suspension, a well healed scar of the perineorrhaphy, and a satisfactory perineal body. The posterior vaginal wall presented a protrusion the size of an orange and extending beyond the introitus. The mass was readily reducible, but immediately reappeared on straining or standing. The uterus was in moderate procidentia and there was a small cystocele.

At operation, November 5, 1937, the abdomen was opened. The uterus was found attached to the anterior abdominal wall by a fibrous band 5 cm. in length, and about this band were draped several coils of ileum. The band was severed and ligated. After closure of the abdominal incision the patient was placed in the lithotomy position and a vaginal hysterectomy performed. The broad ligaments were approximated and sutured beneath the bladder onto the under surface of the pubes. On dissecting the perineum a hernial sac was found, lying between the rectum and vagina and extending beyond the introitus. The sac was dissected free, its neck closed with a purse-string suture and attached to the posterior aspect of the approximated broad ligaments. The excess of the sac was excised and the operation was completed by approximating the levator ani muscles as high as possible.

This resulted in a satisfactory support of all structures and this condition obtains at the present.

Case 2.—(*Fig. 3.*) Miss G., 51 years old, presented herself in December, 1937, with the complaint of backache and "falling of the womb." At the age of 14 years, while carrying heavy buckets of water from the well to the house, she felt something "give away" and soon noticed a protrusion of the vulva. She had not consulted a physician previously concerning this condi-

Fig. 2, Case 1
Recurring posterior vaginal hernia and uterine prolapse.

tion and there had been no effort made to support it. The protrusion gradually increased until it now interfered with walking and sitting.

Examination revealed a Grade 2 uterine prolapse. The posterior vaginal wall consisted of a bulbous protrusion extending well beyond the introitus. There was an associated cystocele.

On December 3, 1937, a vaginal hysterectomy was performed. The cystocele was corrected by suturing the approximated broad ligaments beneath the pubes. On reflecting the posterior vaginal flap a hernial sac was encountered. It was chiefly this posterior vaginal hernia, rather than a rectocele, that accounted for the protrusion of the posterior vaginal wall. The sac was isolated, its neck closed and sutured to the posterior aspect of the approximated broad ligaments. The excess of the sac was excised and the operation completed as a high perineorrhaphy.

The patient's condition remains satisfactory.

It seems likely, in view of the history of this case, that is, the vaginal protrusion appearing at an early age in a nulliparous individual, that the posterior vaginal hernia was the first abnormality to develop as a result of the heavy lifting. And that by its long-continued dragging action it was responsible for pulling down the uterus and bladder. I am unaware of another case which manifested itself so early in life.

Case 3.—(*Fig. 4.*) Mrs. L., 64 years old, presented herself in October, 1940. Para 5, she had noticed a vaginal protru ion since the birth of her last child 22 years previously. This protrusion had gradually increased in size and produced a sensation of pelvic heaviness.

Examination revealed a well-supported bladder and uterus. On the posterior vaginal wall there was a protrusion the size of an orange. With a finger in the rectum a small rectocele could be demonstrated. But lying above and on top of this small rectocele was a posterior vaginal hernia emerging from just beneath the cervix. This hernia was completely reducible by slight pressure, only immediately to reappear and slide down in front of the rectocele on straining.

This patient has not yet come to operation.

Etiology.—Posterior vaginal hernias arise from the bottom of Douglas' pouch. The main bodies of the levator ani group of muscles and the stronger fascial supports pass lateral to the vagina and rectum, and so the floor of Douglas' pouch contains but little muscular tissue and a comparatively thin fascia. It is through this weaker portion of the pelvic sling that the hernia emerges (*Fig. 5*). Dissecting its way downward between the rectum and the vagina, it makes its appearance beneath the posterior vaginal wall.

Whereas, such hernias are found in nulliparous women, the majority of them have occurred in those who have borne many children. In this group of 45 cases, 34 women had given birth to a total of 107 children. In four instances, the individuals were nulliparous, while in the remaining seven cases the incidence of pregnancy was

Fig. 3, Case 2
Large posterior vaginal hernia in a nulliparous individual.

Fig. 4, Case 3
An uncomplicated posterior vaginal hernia.

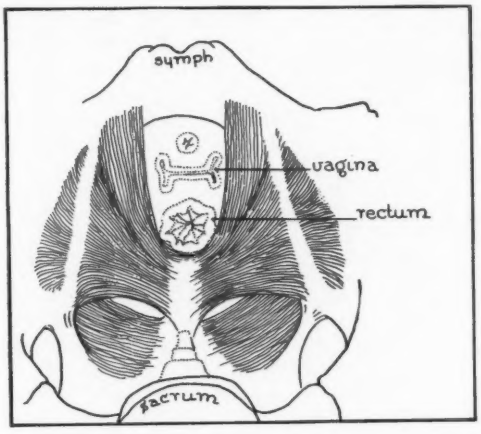

Fig. 5
A schematic representation showing the chief supporting structures of the pelvic sling passing lateral to the rectum and vagina.

not stated. Considering the relaxation of the tissues that accompanies pregnancy and the unavoidable trauma incident to delivery, it seems unusual that such hernias are not recognized more frequently.

Jones[5] has called attention to the unusually deep *cul-de-sac* found in some individuals, which is of congenital origin. He expressed the opinion that this is the determining factor in the development of such a hernia, and explains the occurrence of a posterior vaginal hernia in some individuals and not in others.

Symptoms.—A posterior vaginal hernia presents no characteristic symptoms. It does produce a sensation of pelvic heaviness and dragging down similar to rectocele, for which it is often mistaken. The return of the posterior vaginal protrusion after one or more operations for the relief of a supposed rectocele is not infrequently the first thing which creates suspicion as to the existence of a hernia. In this series of 45 cases, 19 had had a total of 29 unsuccessful operations before the true nature of the condition was recognized.

Physical Findings.—Posterior vaginal hernias vary in size (*Fig. 6*). They may be small and situated high beneath the posterior vaginal wall or large and protrude to or beyond the introitus. Thomas[9] and Miles each record a case in which the hernial sac extended half way down the thighs. A posterior vaginal hernia can occur without an associated relaxation of the pelvic structures, or it may be only a part of the more or less general pelvic prolapse (*Fig. 7*). Since most of them do occur in women who have borne many children, there is apt to be an associated sagging of the pelvic floor. A long-standing hernia of Douglas' pouch may drag down the pelvic viscera with it, thus being primarily responsible for a general pelvic relaxation, as in *Case 2*.

Occurring independently and passing downward between the uterosacral ligaments, burrowing its way between the rectum and vagina, it is comparable with an indirect inguinal hernia. As a part of a general pelvic prolapse in which the peritoneum of Douglas' pouch sags downward along with the rectum, uterus and bladder, it is comparable with a large sliding hernia. In

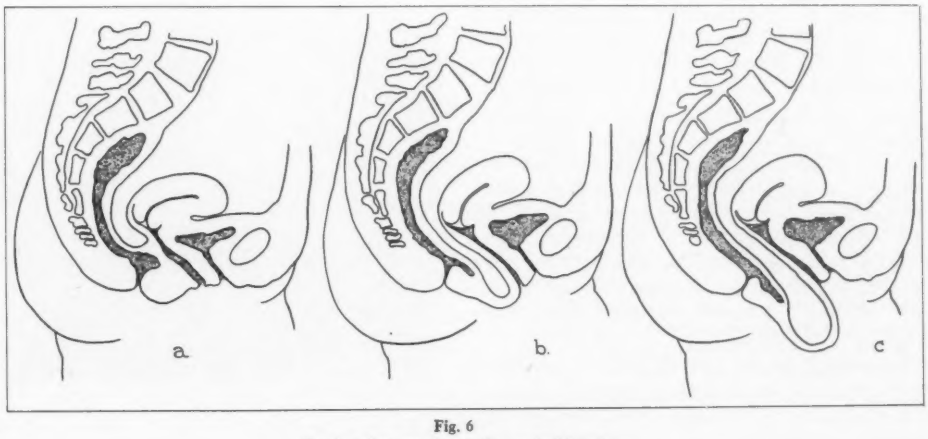

Fig. 6
Varying degrees of posterior vaginal hernia.

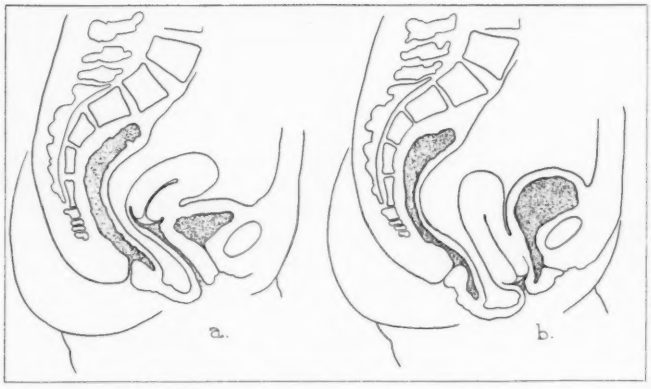

Fig. 7
Posterior vaginal hernia without and with associated procidentia.

either instance the condition represents a true hernia, namely: a protruding peritoneal sac containing abdominal contents. If such a condition is to be cured this prolapsing of Douglas' pouch must be treated as any other hernia, that is, obliteration and closure of the sac and repair of the defect.

One characteristic of this hernia is its disappearance when the recumbent position is assumed, only immediately to recur on standing or straining. Or, if it does not spontaneously reduce itself with the patient lying and the hips elevated, it may easily be replaced within the abdominal cavity by slight pressure from the examining fingers. This reduction may be accompanied by a gurgling sensation as the intestines are pushed upward into the abdominal cavity. Strangulation or incarceration of the contents, of course, would make reduction impossible. Bueermann found that stroking or pinching the hernial sac stimulated peristalsis, which was plainly visible through the posterior vaginal wall.

The one typical sign of posterior vaginal hernia is demonstrated by rectal examination (*Fig. 8*). With the examining finger introduced in the rectum and pressed toward the vagina, it will be found that the bulging of the anterior rectal wall does not account for all of the vaginal mass. With the finger so placed and the patient straining, the hernial sac can be seen and felt to protrude anteriorly to and independently of the anterior rectal wall.

Differential Diagnosis.—Cysts and tumors of the vagina are rare occurrences and should offer little diagnostic difficulty. It is the common condition of rectocele that usually confuses the diagnosis. It is because of the close similarity of these two conditions on casual inspection and because they may be coexistent that the hernia is often overlooked. The surgeon may not be aware of the existence of a posterior vaginal hernia until after he has reflected the vaginal flap preparatory to repairing the perineum. Even then the hernial sac may escape his attention.

Treatment.—The use of pessaries is not successful in controlling a hernia of Douglas' pouch. Whereas, a pessary may very effectively support a rectocele, the sac of the hernia will slip beneath the pessary and reappear at the introitus.

Posterior vaginal hernias, being true hernias, are best treated by surgery. As in any other hernia, the operation should accomplish isolation, eradication and closure of the sac and repair of the defect. Numerous procedures have been employed to accomplish this. No uniform operation is suitable because of the wide variation of coexisting pelvic prolapse. These hernias may be operated upon satisfactorily by the vaginal route, through an abdominal incision, or by the combined abdomino-perineal procedure.

If the hernia has been correctly diagnosed preoperatively, or if it is first recognized during the course of a perineorrhaphy, it may be cared for through a perineal incision (*Fig. 9*). After iso-

Fig. 8
A most important diagnostic procedure in determining the existence of a posterior vaginal hernia.

Fig. 9
Isolation of the hernial sac through a perineal incision.

lation of the sac, its neck is closed with a purse-string suture, incorporating the uterosacral ligaments and the posterior wall of the uterus. The redundant portion of the sac is excised and the operation completed as a high perineorrhaphy.

When associated with a uterine prolapse, a vaginal hysterectomy may be done. The broad ligaments are brought together well posteriorly and the closed neck of the sac attached to the posterior aspect of these approximated ligaments.

Hundley has devised a simple means of disposing of the sac and obliterating Douglas' pouch in conjunction with the interposition operation. After invaginating the *cul-de-sac*, the apex of the hernia is attached high onto the posterior surface of the uterus.

A few cases have been treated successfully by total colpectomy.

When pelvic complications necessitate an abdominal incision, the hernial sac can be cared for very effectively from above. A series of purse-string sutures are placed within the sac, beginning at the bottom and extending upward to the uterosacral ligaments, as advocated by Moschowitz in the treatment of rectal prolapse.

If both an abdominal and vaginal operation are indicated, it is well to make the perineal incision first. The hernial sac is isolated and any other indicated vaginal procedure accomplished. Then through an abdominal incision the sac is disposed of. Either its neck is closed and the excess of the sac excised or the apex of the sac is attached high onto the posterior wall of the suspended uterus.

The general condition of the pelvic floor and any coexisting pathology will determine the method best suited for the individual case. It matters little which operation is employed, so long as the hernia is recognized, its sac eradicated, its neck closed and the defect repaired.

CONCLUSIONS

(1) Posterior vaginal hernia may occur with or without an associated pelvic prolapse.

(2) Clinically they are usually mistaken for rectocele.

(3) Failure to find and obliterate the sac at operation will result in a return of the hernia and a continuation of the symptoms.

(4) The recurrence of a supposed rectocele after one or more operations is not infrequently the first thing which creates suspicion as to the presence of hernia.

(5) Associated pelvic disease will determine the choice of operation. But the sac must be obliterated and closed and the defect repaired if a permanent cure is to result.

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DISCUSSION (*Abstract*)

Dr. John C. Burch, Nashville, Tenn.—Although Dr. Cobb says there is nothing new to be added to our knowledge of this lesion, he emphasizes a point which is new, namely, that these lesions are not rare, but are fairly common, and are generally overlooked.

I am sure that he is correct in his statement, because since 1936 I have operated upon five of these cases. Many others, no doubt, are beginning to think of the lesion, and in the near future it will cease to be considered as a rarity.

There are several points which I wish to emphasize. First, whenever a rectocele is seen, a posterior vaginal hernia must also be considered as an associated lesion.

Secondly, in examining a rectocele, the rectovaginal septum should be palpated between the index fingers, with the patient straining or coughing.

Thirdly, an undiagnosed sac should be sought in every operation for a large rectocele.

Fourthly, the *cul-de-sac* should be routinely examined during every vaginal hysterectomy for prolapse.

Dr. J. B. Lukins, Louisville, Ky.—Compared to hernias in general, posterior vaginal hernia must be very rare. This is both apparent and real. It is apparently very rare for the reason given by Dr. Cobb. It exists often at operation for rectocele and other plastic operations upon the vagina when it is not recognized, and then, as these patients become older, the muscular fibers become more relaxed, and the mass in the vagina becomes larger and perhaps shows on the outside. Then they either come back to you or go to some other surgeon for another operation, and the real condition is diagnosed and properly treated.

Given a weakened pelvic floor and intrapelvic pressure which, of course, is most commonly found after multiple pregnancies or tumors or it may be traumatic, then we have all the factors necessary for the production of a vaginal hernia.

The diagnosis of this condition is not difficult. All we have to do is to look for it. It is just like rectal polyps. If we use our finger and our sense of touch and make a little investigation, the proper diagnosis can usually be made with one finger in the rectum, as stated, and another in the vagina posterior to the cervix. This mass can be felt and can usually be correctly diagnosed.

After it is recognized, then the question comes to our mind, which type of operation should we prefer? It seems to me that unless the abdomen is opened for some other condition, the vaginal route is preferable by far. Those of us who have been in Dr. George Gray Ward's clinic in New York and have assisted him in this operation will see how easy it is. To Dr. Ward, it is just like taking off a mole or a wart. But to a person inexperienced in this type of vaginal operation or plastic repair it becomes a prolonged, tedious and very major operation, and I think this is just one more telling argument against the combination of obstetrical and gynecological departments. If the repair and cure of a condition of this kind is not major surgery, then I do not know what it is.

Every one of you will agree that the slight, low dissection and pushing back of the posterior vaginal mucous membrane, as usually done in the obstetrical way, will not cure this condition.

Many mistakes have been made, polyps removed, I mean, apparent polyps, with fatal results. It seems to me that the vaginal route, if properly investigated and properly used, will give us almost 100 per cent results in these cases.

The point made by Dr. Cobb, that after a thorough dissection of the posterior vaginal mucosa was made, this mass could be properly found and diagnosed, is to me the most helpful practical point in his whole paper. If thorough and sufficient dissection is made, then this mass can be found in practically every case.

Dr. Dan C. Donald, Birmingham, Ala.—Dr. Cobb mentioned the relationship of posterior vaginal hernia to childbirth injury. Among other factors, obesity and congenital defects should be considered.

The hernia may appear as a small bulge at any point along the posterior vaginal wall and occasionally it may reach a size to include the entire rectovaginal space. The degree of herniation is in proportion to damage to the fascia and the length of time the hernia has existed. One of my cases had an incarceration of the sigmoid with a diverticulum into the hernia sac. In another case the enterocele, or hernia, involved the entire length of the fascia plane of the rectovaginal space, accompanied by a prolapsus of the vaginal vault which was secondary to total hysterectomy.

The surgical treatment of posterior vaginal hernia is an individual problem. For the repair of hernia the age of the patient, location and size of the hernia opening may necessitate a change in the surgical procedure. For instance, in the childbearing period the hernia may be corrected by the vaginal route alone. Here the posterior vaginal mucosa is dissected from the perineal body a sufficient distance to expose the rent in the fascia. To secure good approximation of the separated layers of the fascia, two or more interrupted chromic catgut sutures to anastomose the fascia edges will be sufficient. Should there be an associated perineal tear, perineorrhaphy should be done at the same time.

When an incarcerated enterocele, or hernia, is encountered, incise the hernia sac and, should the fixation of the incarcerated mass prevent a reduction, blind dissection through the hernia opening should not be attempted for fear of injury to the involved structures. When such a picture is present do not close the rent in the peritoneum, but approximate the fascia edges from this point down to the perineal body. Then through a low midline incision, with the patient in an extreme Trendelenburg position which affords good exposure of the pelvis, withdraw the incarcerated viscera from the hernia sac and close the rent in the peritoneum as is done in sliding inguinal hernia. This is to be followed with approximation of the vaginal fascia upward from where it was approximated by the vaginal route to the uterosacral ligaments.

The patient with a prolapsus of the vaginal vault following a total hysterectomy with a concomitant enterocele is difficult to treat. Oftentimes in the aged individual it may be necessary, for the correction of prolapsus, to narrow the vaginal canal by performing an anterior and posterior colporrhaphy. For the enterocele apply the above mentioned methods. Then through a low abdominal incision, with good exposure of the pelvis, the remainder of the torn fascia plane is corrected to the level of the uterosacral ligaments. For support to the prolapsed vaginal tissue, separate the anterior and posterior peritoneal layers and anchor the round ligaments to the vaginal vault.

Dr. Cobb (closing).—One of my professors in medical school, the late Dr. David Reisman, used to tell us that when we got out in practice we would find that one of the chief differences between a specialist and one who is not a specialist would be that the specialist would always make rectal examinations. So let us all declare ourselves rectocele specialists, and if we make routine rectal examinations these posterior vaginal hernias will not escape our attention.

THE ETIOLOGY AND TREATMENT OF PULMONARY HEMORRHAGE*

WITH ESPECIAL REFERENCE TO BLEEDING IN CASES OF SO-CALLED "DRY BRONCHIECTASIS"

By PORTER P. VINSON, M.D.
Richmond, Virginia

ETIOLOGY

Almost every pulmonary lesion, whether acute or chronic, may be associated with expectoration of blood which, if small in amount, may cause little or no concern to the patient or physician. When hemorrhage is moderate or severe, it is usually associated with considerable apprehension, and when severe bleeding from the lung is experienced by a patient who previously has been in good health, it constitutes a dramatic and alarming situation. Alarm is occasioned because of the uncertainty of the amount and duration of bleeding, apprehension as to whether it may be sufficient to produce death, and concern as to the seriousness of the causative lesion. Pulmonary hemorrhage has been almost synonymous with a diagnosis of pulmonary tuberculosis except in cases of bleeding in acute pulmonary infection.

Even when bleeding is small in amount, there usually is little difficulty in ascertaining whether it has originated in the lung, and when hemorrhage is severe, the patient can usually identify the lung and sometimes the lobe of the lung from which it has come. If doubt exists as to whether bleeding has come from the trachea or bronchi, the hemorrhage usually is not of pulmonary origin. Bleeding from the lung is almost always associated with cough, and if hemorrhage is moderate or severe, the blood is at first bright in color and frothy in consistency. When active bleeding has ceased, dark particles of blood may be expelled for several hours or longer. Bleeding may be so severe that some of the blood is swallowed, to be regurgitated later.

Bleeding may be associated with lesions in the esophagus, but unless obstruction is present below the site of hemorrhage, the blood flows into the stomach and is later vomited. Hemorrhage from the stomach and duodenum should seldom, if ever, be confused with bleeding from the respiratory tract.

Bleeding from the nose, gums, and lesions in the naso-, oro-, and hypopharynx is easily identified and should not be confused with pulmonary hemorrhage. Frequently a patient who has had bleeding from the lungs is told that the blood has come from rupture of a varix at the base of the tongue; I have never seen hemorrhage from this source. Acute pulmonary infection may frequently be associated with expectoration of blood, but severe bleeding is rarely observed. In pulmonary infarction bleeding may be more copious than in pneumonic conditions, and the blood resembles cranberry jelly in color.

The pulmonary hemorrhage that causes greatest concern is that associated with chronic pulmonary disease. Because tuberculosis is the most common chronic pulmonary disease, hemorrhage from the lung is frequently seen in patients with this condition. Pulmonary bleeding occurs in approximately one-third of the number of patients who have active pulmonary tuberculosis. In a majority of instances the bleeding is small or moderate in amount and usually begins when the patient is at rest. At any rate, bleeding from the lung in a tuberculous patient rarely follows strenuous physical effort. As a rule, bleeding is of short duration but may recur during a period of three or four days. Blood-streaked sputum may be noted for several days after active bleeding has stopped. Hemorrhage is rarely severe in these patients, although fatal bleeding occurs occasionally in those who have a cavity or fibrotic lesion. If facilities are available for roentgenoscopic examination of the thorax, detection of a parenchymal tuberculous lesion is better accomplished by this method than by complete physical examination during the active stage of bleeding.

In addition to bleeding from tuberculous lesions in the lung, ulceration into the lumen of a bronchus of partly or completely calcified hilar lymphatic nodes may cause moderate or severe bleeding. Hemorrhage from this source cannot be identified during life without direct visualization of the tracheobronchial tree.

Carcinoma and benign adenoma of the tracheobronchial tree are frequently associated with bleeding. In the early stages of carcinoma, bleeding is small in amount and recurs daily. As ulceration progresses, bleeding increases and eventually may be the cause of death. Bleeding is usually mild in the presence of benign adenoma, although I observed an alarming hemorrhage following electrocoagulation of a tumor of this type. For exact diagnosis of carci-

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*Read in Section on Medicine, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

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noma and adenoma, bronchoscopy is required in addition to other well recognized forms of examination. Occasionally metastatic carcinoma in the lung may cause expectoration of blood.

Varying amounts of pulmonary bleeding are observed in patients with acute or chronic abscess of the lung. At first, bleeding may consist of little more than streaks of blood in large amounts of foul-smelling, purulent sputum, but if the disease advances, severe or even fatal hemorrhage may occur. Abscess frequently is the result of bronchial obstruction from neoplasm or a foreign body, and bronchoscopy is indicated in all cases of pulmonary abscess to insure accuracy of diagnosis.

Congestion in the lungs secondary to heart disease is also a frequent cause of pulmonary hemorrhage, especially in patients who have chronic mitral endocarditis with stenosis of the mitral orifice. In a previous study I found that pulmonary hemorrhage occurred in 18 per cent of patients who had this type of lesion with dyspnea on moderate exertion. Bleeding may be severe and usually follows strenuous physical effort.

Mediastinal tumor and other more rare types of pulmonary infection, such as actinomycosis, blastomycosis, and syphilis, may produce hemorrhage. I have observed two cases of fatal hemorrhage from the lungs in which postmortem examination revealed a gumma of the bronchial wall with rupture of an aneurysmal dilatation of a large blood vessel. Aneurysm of the thoracic portion of the aorta may produce bleeding either from rupture into, or pressure on, the trachea or a bronchus, and differentiation from other varieties of mediastinal tumor may be difficult.

Foreign bodies in the bronchi, of extrapulmonary origin, may also cause pulmonary bleeding.

A frequent cause of pulmonary symptoms is chronic bronchiectasis, and half of the number of patients affected with the disease have bleeding from the lung. Hemorrhage may be mild or severe and frequently follows physical effort, especially excessive use of the upper extremities. Swimming is particularly likely to induce bleeding. Since bronchiectasis usually involves the lower lobes of both lungs, bronchoscopy is frequently required to determine the source of bleeding. Direct inspection of the tracheobronchial tree should be made during active bleeding, for after hemorrhage has ceased, determination of its origin may be impossible.

In addition to hemorrhage from chronic bronchiectasis which is accompanied by all the well known evidences of the disease, such as cough with production of a large amount of malodorous purulent sputum, and clubbing of the fingers, there is another condition in which bleeding occurs that is popularly known as "dry bronchiectasis." Other designations are hemorrhagic bronchiectasis and pulmonary apoplexy. Dry bronchiectasis is usually observed in patients who have never noted pulmonary symptoms prior to hemorrhage. Bleeding is usually sudden in onset and may recur for a period of several days or at intervals of several months.

In other patients the bleeding may be copious at first and may then continue in smaller amounts over a long time, some of my patients having noted continuous bleeding for as long as a month. Physical examination rarely reveals anything abnormal unless sedatives have been given in sufficient amount to abolish the cough reflex and permit accumulation of blood in the bronchial tree. In such cases breath sounds may be distant or entirely absent over the affected area, and roentgenoscopic examination may reveal infiltration or atelectasis suggesting carcinoma. If sedatives are not administered, the blood is evacuated as bleeding occurs, and roentgenoscopic examination does not reveal anything abnormal. There are no associated constitutional symptoms.

I believe that the diagnosis of bronchiectasis is unwarranted in such cases and that this terminology is confusing in classifying patients who suffer from chronic suppurative pulmonary disease. A better diagnosis is bronchial erosion with pulmonary hemorrhage. Origin of the hemorrhage is comparable to nose bleed that results from minute inflammatory erosions in the nasal mucosa. In a patient whom I examined recently, bleeding had been profuse and cough had been controlled so effectively with sedatives that blood had clotted in the lower lobe of the right lung, giving physical and roentgenoscopic evidence of primary bronchial carcinoma (*Figs. 1* and *2*). At bronchoscopic examination a large amount of clotted blood was removed from the bronchi, and tissue was obtained from the depths of a bronchus that was actively bleeding. Microscopic study of the specimen revealed chronic granulation tissue (*Fig. 3*).

TREATMENT

Treatment of patients with pulmonary hemorrhage depends on the severity of bleeding and the causative lesion. Fortunately, bleeding from the lung rarely results fatally when it is from

a lesion that is amenable to treatment. Exception to this statement may be observed in a few cases of pulmonary tuberculosis with cavity formation when surgical collapse of the lung might have controlled or prevented bleeding.

A patient who has bleeding from the respiratory tract should be kept quiet, and apprehension should be relieved by mental reassurance rather than by drugs. If a sedative is employed, the dose should be small, never in an amount large enough to interfere with the normal cough reflex. Evacuation of blood or secretion from the bronchi as soon as possible is advantageous. If cough is abolished by medication, retention of secretion may produce serious complications, especially when bleeding has resulted from tuberculosis, and retention of blood by administration of sedatives has led to dissemination of the disease. Unnecessary cough can be controlled voluntarily and without use of drugs, but cough that is productive of secretion should be encouraged.

No treatment other than rest is required in the majority of patients who have bleeding from the respiratory tract, but if hemorrhage is severe or recurrent, transfusion of whole blood, gum acacia, or normal salt solution may be indicated. Injection of horse serum or small amounts of hypertonic salt solution (50 per cent) has also been recommended.

Compression of the lung by artificial pneumothorax or thoracoplasty is sometimes indicated when bleeding is associated with tuberculosis, but should seldom, if ever, be employed when bleeding has resulted from other lesions. In bleeding

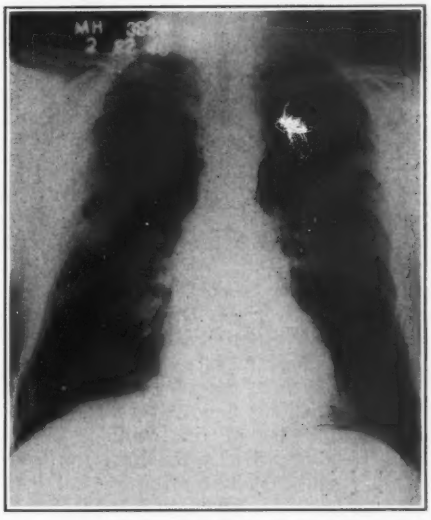

Fig. 2
Same patient one month later; note clearing of shadow on right side.

Fig. 1
Roentgenogram of thorax of patient with hemorrhage from bronchial erosion; note infiltration in right cardiophrenic angle with elevation of diaphragm simulating primary bronchial malignancy.

Fig. 3
Photomicrograph of tissue in case of bronchial erosion.

with tuberculous disease of the lungs, bronchoscopy may be required to determine the source of hemorrhage before collapse therapy is instituted.

Hemorrhage that has resulted from foreign body in the bronchus almost always ceases upon removal of the foreign body.

Patients with chronic mitral endocarditis, in whom the mitral orifice is stenosed, should avoid excessive physical exertion, especially if pulmonary hemorrhage has been noted with exercise.

Although fatal hemorrhage has rarely, if ever, resulted from chronic bronchiectasis, bleeding may be an annoying symptom. When these patients tend to bleed with exercise, postural drainage should not be employed because the effort associated with forcible evacuation of secretion from the bronchi frequently precipitates bleeding. When hemorrhage is severe and prolonged in patients having bronchiectasis, collapse of the lung may be considered. However, the complications that may ensue as a result of compression of the lung, uncertainty of controlling the bleeding by this method, and the fact that bleeding will almost always stop spontaneously, usually contraindicate pneumothorax or thoracoplasty. Pneumonectomy or lobectomy may be indicated in rare cases of unilateral pulmonary infection with hemorrhage.

The most satisfactory results from treatment for pulmonary hemorrhage are obtained in patients who have bleeding from an erosion in one of the smaller bronchi, so-called hemorrhagic bronchiectasis. If bronchoscopic examination is made on these patients when bleeding is active, the eroded bronchus can be identified, and introduction of an aspirating tube into that bronchus usually controls bleeding. Hemorrhage rarely recurs. Cessation of bleeding is probably achieved by curettement of granulation tissue from the eroded bronchial wall. Recently in a few patients I have insufflated powdered sulfanilamide into the depths of the bronchus after the wall was thoroughly curetted, but this procedure is not a necessary adjunct in treatment.

CONCLUSIONS

(1) Pulmonary hemorrhage occurs frequently in patients with chronic pulmonary or cardiac disease, and if bleeding is severe, the effect may be alarming although usually not serious.

(2) Pulmonary tuberculosis, because of its frequency, is the most common cause of pulmonary hemorrhage, but a diagnosis of tuberculosis on the basis of such bleeding is unwarranted.

(3) The most frequent cause of pulmonary bleeding in patients who have been in good health prior to hemorrhage is simple inflammatory erosion of the wall of a small bronchus.

(4) Sedatives may be given in a small amount to allay apprehension, but the medication should never be administered in a quantity sufficiently large to abolish the cough reflex and cause retention of blood in the tracheobronchial tree.

(5) Bronchoscopy with curettement of the bronchial wall by means of an aspirating tube usually controls bleeding from simple inflammatory bronchial erosion.

DISCUSSION (*Abstract*)

Dr. Maurice G. Buckles, Louisville, Ky.—I want to emphasize the importance of care of hemorrhage, and of doing everything possible to determine the cause of hemoptysis. It often has such a benign onset that wishful thinking may cause us to delay investigation and treatment until there is an exacerbation of the process, with more serious symptoms.

Roentgenology can give us a great lead in these conditions. It may localize the lesion; on the other hand, it may show nothing. The condition may be of an extent in the bronchus that it cannot be visualized on the ordinary x-ray film.

Injection of iodized oil is important in some of these cases; it points out lesions that do not show on the regular film. The bronchoscope is of great value.

Proliferation from the bronchial wall may readily give us a small amount of bloody sputum. Biopsy from an area of this type may show giant cells and tubercle bacilli. Repeated cauterization of the area is beneficial.

The endoscopic view may show a proliferative lesion that produces a partial obstruction that may easily erode and give a small amount of blood-spitting.

A lesion off the hilus may be missed. We see many x-rays with an increase in the hilar markings which we are not quite sure about, yet we can do very little about. A recent case of this type proved to be a definite squamous cell carcinoma.

Some mediastinal tumors or metastases may show, instead of a sharp, definite picture, a rounded effect, a mass in the mediastinum, which causes considerable obstruction on either side. Some infection may occur, with redness and diminution in the size of the lumen, and there may be a small amount of blood-spitting.

A case of aneurysm of the arch of the aorta produced two types of lesion, one very slight, one fatal. There was a lung abscess in the base, with high fever. We went in very gently with the bronchoscope and relieved the accumulations in the base. Definite cavity formation was present. We aspirated a large quantity of this material. This patient one year later died of a hemorrhage from rupture of the arch of the aorta.

Upper lobe bronchiectasis is not uncommon. Basal

bronchiectasis may occur in the same patient, therefore may come from above in the true bronchiectatic cases.

The inside of the bronchus in cases of bronchiectasis may show numerous granulations in some areas with other fairly normal areas. The granulations may erode, break down, and give blood-spitting. Further down, of course, the aneurysmal effect is probably very common.

In cases of tuberculosis with streaked sputum, local applications may cause cessation of the hemoptysis.

Cauterization of an ulcer may be beneficial.

Acute inflammatory processes may give considerable oozing from swelling and induration, with obstruction and infection.

I certainly agree with Dr. Vinson that a great deal can be done for these so-called unexplained hemoptyses, and I think his term "bronchial erosion with ulceration" is a very good one to differentiate the condition from the more suppurative processes. Many of these are associated with small amounts of chronic infection, but not to the point that diagnosis of bronchiectasis can be made.

Dr. Lawrence W. Nehil, Louisville, Ky.—Dr. Vinson warned against postural drainage in bronchiectasis because he believes this may result in hemorrhage. This has not been my experience. I believe that the treatment of bronchiectasis for those patients who are being prepared for surgery or who cannot have surgery should be postural drainage. This should be either intermittent or continuous. By continuous drainage I mean that the foot of the bed is elevated about twelve inches and the patient placed in a position that allows him to drain continuously. This patient must have had a complete delineation of the lung fields and each lung completely filled with contrast media. We must know exactly where his bronchiectasis is situated. When you understand the anatomy of the tracheobronchial tree, you can place these patients in a position of continuous postural drainage without any danger of hemorrhage and with considerable relief to the patient.

With regard to treatment in cases of mixed tumor or so-called adenoma, I believe that lobectomy or possibly pneumonectomy is the treatment of choice. When you treat these cases bronchoscopically, you merely remove that part extending into the bronchus and leave the remainder within the lung to grow. Since there is considerable evidence that these tumors may become malignant, they should be treated by radical excision.

It has been my experience in hemorrhage from bronchiectasis that it can be very severe and I believe that in those cases in which it persists it is an indication for surgical removal of the diseased portion of the lung.

After running the entire gamut of the causes of pulmonary hemorrhage, which has confused me, I believe that the essayist has presented twenty cases which had a pulmonary hemorrhage and in which bronchoscopy was done. The bronchoscope was merely inserted into the bronchus from which the bleeding was coming and some of the "miracle medicine," sulfathiazole, injected. I should like to have Dr. Vinson explain how he feels that this controls the bleeding.

We have all seen cases of pulmonary hemorrhage in which we were unable to find the cause and in which bleeding was not remarkable nor was there any recurrence of hemorrhage. In many of these patients bronchiectasis might have been discovered by study with iodized oil.

Dr. Vinson (closing).—I am afraid that I did not make myself thoroughly clear about postural drainage in bronchiectasis. In patients suffering from bronchiectasis in whom bleeding occurs following physical effort, postural drainage is contraindicated. In those who have no tendency to bleed there is no reason why postural drainage should not be employed if it is desirable.

I do not feel that radical surgery is indicated in patients who have bleeding from the lung from bronchial erosion because, as I have said, of twenty patients whom I observed in the past four years with this type of bleeding, none had recurrence after having had the treatment which I described.

TRENDS IN PSYCHIATRIC TEACHING AND PRACTICE*

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An account of the trends in the teaching and practice of psychiatry as set forth in this paper are for the most part related to psychiatry as it exists today in a general hospital. Historically speaking, there is nothing new in the idea. In 1816, a group of private citizens in Lexington, Kentucky,[1] banded together to found a private hospital because of the desperate conditions existing among the "poor and diseased," and became incorporated under the name "Contributors to the Fayette Hospital." They bought the Sinking Spring land one mile from the city, but shortly after the foundations of the hospital were built, the financial panic struck, and funds depreciated to almost nothing. Had the hospital been completed, all types of patients (including the mentally sick) would have been treated there, the private citizens of the community assuming the financial responsibility. Because of the panic, the citizens appealed to Governor Adair in the hope that the State government would assist. In 1822, the State finally bought the property for a hospital, but only mental patients were to be admitted.

This was the beginning of the separation of the mentally sick from the physically sick in Kentucky, as had been done in Virginia in 1767. Certainly the old New York Hospital in the 1700's cared for the mentally sick under the

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*Chairman's Address, Section on Neurology and Psychiatry, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

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same roof with the other patients. The point to be remembered in this introduction is that in the early days before state care came into vogue, hospitals did think in terms of treating all types of sickness in the general hospital. Now, in 1940, we are thinking in these terms again, in relation to the early treatment of the nervous and mental patient, more especially in the public general hospitals connected with medical schools.

Today, we realize that the same stresses and strains can produce in one person an aching head, so to speak, with symptoms of anxiety and confusion, and in another an aching stomach, that may go on to ulcer formation. To keep the latter patient in a well-appointed general hospital and send the former away is to put a premium on illness of the tissues, which is often the end result of years of disordered personality function. I doubt that the citizens supporting general hospitals really wish to render better hospital service to those who feel the stresses of life more poignantly below the eyebrows than above. If so, what a tribute to the old organs in our biological evolution! And what a lack of interest in the newer and therefore more vulnerable ones. The concern of modern medicine, however, is the healthy functioning of the total organism as a unit, the treatment of the total person.

Public general hospitals have led the way in the field of general hospital psychiatry, not because the private general hospitals do not admit patients with all types, if not all degrees of nervous and mental illness, which they do in great numbers; but because large public general hospitals are good teaching hospitals and as such effectively organize their services around a teaching staff.

Concerning the trends in psychiatric teaching, medical students and interns in a number of hospitals today are not only given excellent training in diagnosis, the recognition of the importance of the interplay of constitutional and social factors in disease[2] [3] and the treatment of acute mental illness, but also opportunity to study and evaluate the psychiatric problems of patients on the medical, surgical and other wards and clinics of the general hospital.

Perhaps not more than 25 per cent of the total hours devoted to psychiatry in the modern medical school curriculum is concerned with the insanities as such, and 75 per cent with those maladjustments in children and adults that play an important role in the development of those complaints and diseases for which they are admitted to the general hospital. Whereas some schools with no psychiatric wards in their general teaching hospitals have concentrated their teaching on the general wards and clinics, the trend is definitely toward a combination of both teaching services under one roof, namely, a small psychiatric ward for acute sick and the general hospital wards and clinics for the study of psychosomatic medicine. Memphis is building an interesting psychiatric service in the new outpatient building of the teaching hospital. A psychiatric service is being developed in the new City Hospital in New Orleans. The University of Texas, Duke and the University of Virginia now have psychiatric services in their teaching hospitals; Atlanta is contemplating one. Certainly the trend is away from the building of separate psychiatric hospitals.

It is of interest to note the type of case referred this year to our outpatient psychiatric clinic for senior student instruction. The majority of these patients are referred from the general wards and clinics. In looking over the "chief complaints" of 100 patients referred to the clinic during the past year, only a small percentage came in complaining of so-called pure psychiatric symptoms. An overwhelming majority complained of somatic symptoms which had taken them first to other clinics. As a matter of fact, there were more patients with real organic disease than with psychic symptoms alone, such as anxiety, depression, compulsion and fears. It is of interest that the physicians in the medical clinics referred so many of these organic conditions in which they sensed some nervous or mental complication. It is utterly impossible to classify these patients. For instance, over 10 per cent of them came in with complaints of pain in the abdomen. Some of these had indigestion, several had gone on to demonstrable tissue lesions. Some had lower abdominal cramps, and others had all the signs of mucous colitis.[4] When these patients were assigned under staff supervision to senior medical students for daily interviews over a period of two and a half weeks, well over 60 per cent of them showed improvement before the end of three weeks. According to the follow-up study during the summer on these patients, the above percentage of improvement for the group continued.

Furthermore, here is an opportunity for the practice of preventive medicine for it has been shown elsewhere

"that the peak of the age incidence curve of the psychiatric patients seen in the General Hospital lies between the ages of 21 and 30 years, which is earlier by ten years

than the peak of a similar curve of patients sent to the Psychopathic Hospital and from 15 to 20 years earlier than the peak of a similar curve plotted of the patients admitted to our state asylum."[5]

While our junior medical students are doing section work on the psychiatric wards, they also have two ward walks each week for three and a half weeks on the medical services. One day recently, the resident stopped beside the beds of two gastric ulcer patients for the students to interview with the assistance of the staff man. In both instances the students brought out to the satisfaction of the group, very strong personality drives, exaggerated independence, little or no capacity to relax or delegate responsibility, and marked affectional deprivation during early years.[6] This left no doubt in the minds of students and patients of the importance of personality factors in the chain of events leading to gastric ulcer. On the next ward walk, two cases of essential hypertension were interviewed, showing remarkably parallel tense personality with strong hostility inadequately expressed or accepted.[7] On the other hand, I have recently studied a middle-aged patient with low blood pressure who presented much this same general picture. Psychosomatic medicine, of course, is in its swaddling clothes, but it looks like a husky baby.

Another patient became confused and disoriented following a second attack of coronary occlusion. At first, there seemed little to demonstrate here of a definite psychosomatic nature. However, when 200 mg. of bromide[8] showed up in the spinal fluid, it gave us the lead. When the confusion cleared, we discovered that the nature of the family irritations which were unacceptable to a woman of her personality had resulted in bromide addiction. An excellent recovery was made and psychotherapy substituted for the bromides. Later she went through a third attack of coronary occlusion with no sensorial disturbance whatsoever.

When a public general hospital affords such excellent teaching material as this, in spite of the policy of not accepting nervous and mental patients on the medical services, how much richer is the teaching material in the hundreds of our larger private hospitals where such a policy of excluding the private nervous patient rarely exists. And yet, interns in private hospitals tell me that they seldom have an opportunity of studying the maladjustments of private patients under the supervision of staff men. Why should not all general hospitals aim to treat the total patient entrusted to their care? One of the most satisfying things about this work is the interest shown by members of our medical and surgical staff.[9] For instance, one of the two ulcer cases mentioned above had had two hemorrhages. The professor of surgery said it was necessary to operate, but hoped that the patient might receive intensive postoperative psychotherapy because he was convinced that this offered greater opportunity for making permanent the results obtained.

In another conference with the surgeon, internist and psychiatrist, the surgeon asked the internist if in his experience gastric ulcer and mucous colitis were found frequently in the same patient. The internist replied, "Rarely indeed," adding that such conditions occurred in two different types of individuals. Both men were much interested in a review of the different personality factors frequently noted in these upper and lower gastro-intestinal disorders. House officers profit greatly by this sort of thinking on the part of the staff.

This leads us to the subject of intern training in the teaching hospitals of today.

Let us for a moment compare psychiatric training of interns in a public teaching hospital with that existing (with few exceptions) in the private general hospitals in this country. In 1932, Dean John Walker Moore, professor of medicine, University of Louisville School of Medicine, established a system of rotating all medical interns through the psychiatric service which consisted then of a 40-bed inpatient service, and later was enlarged to include an outpatient psychiatric clinic to which patients from the general hospital wards and clinics are referred. Each assistant resident on medicine becomes resident on psychiatry for a period of six months; each senior intern two months; and each junior intern six weeks. These men conduct the work of the psychiatric wards and clinics under the supervision of three full time staff men. In eight years, 88 first year interns spent six weeks on psychiatry; 24 second year interns had two months; and 16 assistant residents had six months. These assistant residents, therefore, had in all over nine months of psychiatry during their three years of medical internship. The dean's idea in doing this may be summed up in his own simple statement, "It ought to make them better doctors." Before going on,

would it not be of interest to know what the assistant residents on medicine think of psychiatry after being out from one to seven years? Recently a questionnaire was sent to all sixteen of these men. A brief report of their answers follows. As four of the sixteen went into psychiatry, they will not be included in this report. Of the remaining twelve, ten are engaged in general medicine, one in surgery, and one is now resident on medicine.

To the question, "Roughly, what percentage of your patients in general suffer primarily from some sort of nervous disorder (exclusive of frank organic neurologic cases)?" the average percentage given was 23.

To the second question, "What percentage of your cases with definite organic disease shows psychiatric problems?" the average percentage reported was 34.

The first figure adds nothing to what is already known. The second merely reaffirms the fact that the practitioners are becoming more and more conscious of the psychiatric problems in their patients with organic disease.

To the question, "Are you definitely interested in treating such nervous conditions?" all but one said that he was.

To the question, "Roughly, what percentage of these patients do you think are benefited?" the average percentage reported was 62.

None of these men said that they had had too much psychiatry during their three years of internship; two-thirds said they had had sufficient; and one-third said they had had too little.

Fifty per cent felt the need for post-graduate courses. There was a wide range of suggestions as to the content of these courses.

To the question as to whether their work in psychiatry made them better physicians, 100 per cent answered in the affirmative. As to how much it meant to their personal development all but one replied that it had considerable meaning.

If these answers are indicative of trends, it would seem reasonable to draw the tentative conclusion from them, that the young practitioner of medicine today is not only conscious of the psychiatric problems of his patients, with or without frank organic disease, but he is also definitely interested in treating these psychiatric problems.

So far, I have spoken of the trends in the practice of psychiatry only as it exists in connection with the teaching of the medical student and intern. I now wish briefly to discuss trends in the practice of psychiatry by asking and endeavoring to answer a question that is of considerable concern to many general practitioners and others with whom I have conversed, namely, "Why do not more psychiatrists go into private practice?" Frankly, I do not know the answer, but I should like to devote the rest of my time today to a discussion of this problem.

There are whole states in which there is only one qualified psychiatrist, exclusive of the sanatorium psychiatrist, who is devoting his entire time to psychiatric practice in the community. No one perhaps knows the demands for private psychiatric treatment better than the psychiatrist on the staff of medical schools in these states. So great is this demand that he must either refuse to see any private patients, or if he tries to respond to all the calls of physicians, he must work beyond his capacity. Often I hear it said,

"If I could only do a limited consultation practice and refer these patients to a private psychiatrist for treatment, as is done in the large metropolitan areas, that would be ideal."

The demand is great and physicians do want to refer patients to psychiatrists. Where are the psychiatrists? Are there too many good salaried positions in mental hospitals, medical schools, clinics, and government services? Do Southern physicians trained in psychiatry in the East stay and practice there? Is it because they are afraid they cannot make a fair living, that the public wishes to pay no more for an hour's interview than for a ten-minute office call? Is there something in the psychiatrist himself, something he brings to his specialty as someone expressed it, a sort of "perfectionistic" search for fundamentals rather than a taste or aptitude for the type of personality development that successful private practice is thought to require? Or could it be that the training of the psychiatrist today is more likely to fit him for the intramural practice of psychiatry rather than extramural? Each of us here today could add to this list of possible contributing factors. The fact is we do not know the answer, but we should make every effort to explore the possibilities and adopt an experimental attitude of mind in the process.

However, the last question raised, more particularly, I think should excite the interest of everyone in the teaching field. Certainly the recognized medical centers offering post-gradu-

ate instruction in psychiatry in this country are excellent. Very few psychiatrists from these centers come away without good basic training and a research point of view. Credit for this is due I think largely to foundations that have so generously supported this work with fellowships and educational goals when these were needed. Since few of the men trained in these centers go into private practice, both foundations and teaching centers should be particularly interested in this problem. There is no training center with which I am acquainted that has consciously at least, set as its goal the preparation of men for the private practice of psychiatry. I do not believe psychiatrists themselves can do this without the help of the family physician. He would be as important an instructor of fellows in training as the psychiatrist himself. How to get these two working together ought not be a difficult undertaking if the proper setting could be agreed upon. Is there any better setting for this than the private general hospital, with a sympathetic staff and board of directors? Fellowship training could be carried on quietly under a faculty of either attending or full time medical men and psychiatrists with experience and aptitude for private practice. Only modest physical facilities for a small number of acute sick would be needed, for most of the consultation and treatment work would be carried on in the patients' own rooms.

If, therefore, such an experiment could be put into effect and financed as a research problem, what could it accomplish? The trainee would have the valuable viewpoint of the family physician referring the patient, and be able to consult with him freely concerning the medical history, the background, the family interrelationships, and the delicate art of handling the patient and his relatives which he has learned in the hard way, not in the protected environment of institutions where we find most of our psychiatrists. Furthermore, he would live in close association with the house officers and attending men in all fields and be in daily touch with the staff psychiatrist.

No one would profit more, of course, by this arrangement than the patient himself for his physician would be able to obtain quick and thorough service from men whose pre-fellowship training in neurology and psychiatry renders them capable of assuming treatment responsibility.

The family physician is the hub of the wheel. The spokes represent supporting fields, laboratories, x-ray, psychiatry, eye, ear, nose, throat, all of which are but special arms to the family physician in his practice of the healing art. Just as the general practitioner refers a case to the x-ray man to find out the contours of the hidden stomach, in no more formidable sense should he call upon the psychiatrist to help him find out the contours, if you will, of his patient's more or less hidden personality patterns. Given both the x-ray findings, for instance, and the underlying personality patterns, the family physician is better able to diagnose, treat and prevent future trouble. He does not expect the x-ray man to cure his patient, and neither should he expect the psychiatrist to perform miraculous cures. A realistic conception of what the psychiatrist really has to offer the family physician and vice versa, and a confidence built on the basis of that mutual contribution is urgently needed. But that confidence must be built upon actual demonstration, not only to convince the family physician but also to convince the young psychiatrist himself that he can successfully assist the family physician in treating the run of the mill patient in the general hospital. If he is certain that he can do this successfully in the private general hospital, he will then know that he can do it in private practice. Whether such a training course as this suggested will meet the need, only the future will determine.

These are the trends, as I see them, in the teaching and practice of psychiatry.

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EDUCATION OF PUBLIC HEALTH PERSONNEL*

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Two serious difficulties are met in considering education of public health personnel. First, there is no general agreement as to the extent and make-up of the field of public health; and second, personnel in this field is not all of one sort. While for these reasons a discussion of the education of public health personnel must be tentative and qualified, these limitations do not alter the fact that operating health organizations are faced with the problem of how their workers may best be fitted for future competence. Nor does an admission of deficiencies in definition help to answer the questions of the universities, which, being not quite sure that their subject matter, their course sequence, and their teaching methods are entirely satisfactory, are critically studying their curricula in public health.

To get a view of the present situation and its trends it is desirable to review briefly how education in public health work has developed. At first, the demands of programs were such that almost any physician, on the basis of his medical education alone, was considered competent to serve as a health officer. Then, as the programs expanded, nurses were employed, and sanitary engineers and inspectors. As was the case with physicians, the basic professional education of the first two, and the lack of any such status in the last, were accepted as adequate. Of those who entered the work in these circumstances, some acquired competence by trial, and others fell by the way through error. Unfortunately, some of those who erred did not fall.

As it became obvious that this method of staff education was a slow and, in more ways than one an expensive process, and not entirely satisfactory, other procedures were tried. The principal one was the field training station, where by a short apprenticeship the new appointee was familiarized with the way in which typical procedures and services were carried out in that particular locality. In a few instances the field training area was especially set up for providing this experience. More frequently, however, the state health officer merely selected one of the localities in which reasonably good work was being carried on and sent to the doctor, nurse and inspector, there to learn what they could. The length of time that the trainee remained varied. Where the program was formally arranged, the period was from six to twelve weeks. But often the new appointee had to report upon his or her permanent job on a particular date and might get only a week or two of field experience before assuming duties. Persons who went through this type of training learned a good deal of the how but very little of the why of public health work. They were, to some extent, prepared to duplicate in their new assignments the things which they had observed in the training station. In many ways they did, and even today do, help to solve, and rather quickly, the immediate problems of the state health officer. They could institute quarantine and isolation in accordance with the laws and policies of that state. They knew that the roof of a sanitary privy must have an overhang of six or sixteen inches in the rear to meet departmental specifications. They knew where to send a dog's head to have it examined for Negri bodies. They were not prepared except through innate ability and potentialities to meet new problems, to make contributions, or to occupy more responsible positions.

At about the same time that the field training stations were being developed, rather formal courses in public health, occupying a full academic year of study, were offered by some of the universities. The approach here was quite the reverse of the training program. So far as concerns the course offered for the health officer, the general intent was to ground him thoroughly in sciences basic to public health. It was emphasized that the student would receive an education in public health rather than training for a particular job. The philosophy behind this approach was that one with a broad basic knowledge of the principles involved would be able to analyze any problem which might arise, regardless of whether or not he had encountered this same problem before, and would thus be in better position to function in the future. Further, it was and is believed that this education in principles and analytic approach would make it possible for him to continue to develop in any of the fields of public health in which he might be needed or in any position to which he might be promoted.

Under the stimulus of fellowships with stipends for living expenses, these university courses to a great extent replaced training in the field

*Read in Section on Public Health, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

station; and yet, from the standpoint of the administrator who was to put to work those so prepared, the academic year in a school of public health was not without its drawbacks. Part of this perhaps was due to a lack of understanding between the tough-fibered administrator and the university professor. The first was and is inclined to judge the product of the university education in terms of how much good is the graduate on the day he returns home. The second has a tendency to disregard today in order to gear the student for unusual accomplishment in ten years' time. The state health officer wants the man returned to him thoroughly grounded in details. The course in public health has been more concerned with what is vaguely called disciplines. Again, the division chief who is to put the Master of Science in Public Health to work in a child health conference wants that individual to know how to run a child health conference, whereas the instruction the student was given was more largely along the lines of why child health conferences are operated. Perhaps these varying perspectives may best be summarized in this way: the state health officer feels that if an epidemiologist is good he may in time become an administrator, whereas the teacher's attitude has been that the only good administrators are dead administrators. These disagreements were and are not serious. On the contrary, they constitute worth-while evidence of growth and vigor, to be expected and to be studied profitably.

About ten or twelve years ago a somewhat new method of preparing public health personnel was put into operation. This became known as the short course, and was offered by universities in close cooperation with and under the stimulus of state health departments. The course consisted of six to eight weeks of intramural instruction plus four to six weeks of field experience in training stations set up for the reception of students. Instruction here must be largely vocational. There is not time for basic sciences. There is not much opportunity for delving into general principles. There is no possibility of the research approach. Instead, students were and are taught mainly procedures involved in various programs in which, in a short time, they must participate. The faculty in these short courses is made up of university and state health department personnel, the latter usually predominating.

In many ways the products of these courses more nearly met the immediate needs of the state health officer than did those who had spent a full academic year in intramural instruction. In the first place, the short-term students were available much more quickly than those who were to be away for a long period of time. Secondly, those who had completed the course resembled to some extent Mr. Kipling's female, in that they were launched for one sole issue, armed and engined for the same. They were ready to go to work as health officers, even though they did not have the ground work for the future.

The discussion heretofore has largely concerned the development of courses designed to prepare students to enter general duty in the health field. It is not practicable to go into detail as to public health courses and field experience for nurses, engineers and sanitary inspectors, but it may be said that they have gone through a somewhat similar development. The engineers have received their special training in public health along two general lines: they have gone either to schools particularly set up for intensive courses in the engineering and environmental-biologic aspects of public health, or they have attended one of the more general public health schools, taking the same basic courses as do the health officers, but concentrating their electives in the field of sanitation. The nurses, in their public health education, in some instances rather completely broke away from the medical and hospital atmosphere and established their public health courses in teachers' colleges. To some extent this was from necessity, but to a considerable degree from choice. The necessity arose because the majority of nurses do not possess a bachelor's degree and are not, therefore, in position to do graduate work. Teachers' colleges are geared to give undergraduate instruction and the schools of public health are not. Another reason, however, for the placement of public health nursing education in teachers' colleges is that the leaders in public health nursing regard the public health nurse as essentially a teacher and, with this in mind, have felt it highly important that these students receive instruction in teaching methods. While it is an open question as to whether or not the instruction in teaching methods which she receives may be applied by the nurse in the field as they would be applied in a classroom, public health courses for nurses do provide instruction along certain lines which the public health schools have neglected. Reference is here made to the fact that the nursing education in public health includes courses in sociology and psychology. These were not provided in the establishment

of the conventional public health curriculum, and even today are recognized only grudgingly and sparingly.

Until comparatively recently sanitary inspectors learned their jobs by experience. They are now becoming more conscious of themselves as a group and most of them are quite ready to make sacrifices for formal training. It has not been easy to provide public health education for inspectors, although a few universities have set up courses designed to meet their needs. Their educational background has in the past ranged from sub-high school to a year or two of college work, with an occasional graduate. The demands of their jobs may necessitate highly specialized knowledge in a limited field, or rule of thumb procedures in many aspects of sanitation. Thus one may be entirely concerned with drainage operations and malaria control, another with the inspection of food, a third may devote his entire time to the sanitation of dairies. Again, there is the inspector who is an expert in building the sanitary privy and nothing else, and finally, in the small town, one may do a little of everything. In most places, their instruction has been and continues to be on the sub-professional grade.

Public health personnel naturally includes personnel who occupy categories not already referred to. There is the statistician, who comes with a mathematical background; there is the helminthologist, protozoologist and entomologist, most of whom have a basic training in biology. Coming strongly to the front is the industrial hygienist, who may be a physician, an engineer, a physiologist, a chemist. The bacteriologist may be medical or non-medical, the nutritionist may have been drawn from biochemistry or physiology or may have traveled the road of home economics. The worker in health education may come from the teaching field, the medical field, from the newspaper, or may just have gotten interested in health education. In addition, and extremely important, are those in the medical field who will engage in the clinical aspects of public health: tuberculosis, syphilis, acute communicable diseases, maternal hygiene, infant hygiene. In most instances, persons engaged in clinic work have already had considerable postgraduate instruction in their special fields. They may or may not obtain graduate instruction in public health.

It will be noted that no reference has been made to public health courses for medical students. This has been omitted rather deliberately, with the belief that courses of this sort should be designed to meet what will be the needs of the practitioner of medicine rather than of a career worker in the field of public health. Quite obviously, a respectable course in preventive medicine and public health will arouse the interest of medical students, give them more understanding of public health work, and may cause some of them to look favorably upon this field. It is to be doubted that one may hope for more than this in the medical school; it is certainly a mistake for instructors in medical schools to attempt to make little health officers out of medical students.

In this attempt to review methods of education of public health personnel there has been an effort to recognize certain problems and trends, and to bring the situation up to the present. The problem today is being watched and commented upon by various organizations, interests and individuals. For some years the American Public Health Association has had a committee on professional education, which from time to time issues restrained but suggestive reports. In a few instances, public health schools have been inspected and rated, for one reason or another. From time to time papers such as this appear. Naturally, there are divergent opinions in the matter. There are, for instance, those who believe that public health courses are too practical and approach the vocational, which word, of course, is anathema in most university circles. On the other hand, an equal or greater number think the courses are too theoretical, that too much time is spent upon matters quite remote from the problems which the student will in future meet. One not infrequently encounters the suggestion that an authoritative agency should lay down minimum standards as to content and length of courses, as was done to some extent in medicine about thirty years ago. Opposed to this idea is a group which believes that education in public health is too new, the demands in the field too shifting to permit any standardization of courses, and who are convinced that standards would stifle healthy development. Again, if the matter were left to some of those in the academic field, the student would spend all of his time in research of one sort or another, while if others had the controlling voice, the course in public health would consist essentially of supervised field experience. There is, too, some conflict of opinion as to whether any course in public health may fit a non-medical person to assume the duties as health officer, and in some of the large cities the training which

medical social workers have gotten is considered as adequate for the performance of most of the work of the public health nurse, except bedside care. Finally, there are those who seriously question whether any course in a university makes an individual competent to enter immediately upon his or her duties in the health field. Persons thinking along these lines compare postgraduate public health work to medical education. They believe that the recent graduate in public health needs something comparable to an internship before he may be profitably and safely utilized without close supervision.

From this background of problems and practices and divergent opinions, one may not safely indulge in unalterable convictions. It does seem permissible, however, to draw certain tentative conclusions, and these are submitted for consideration.

(1) The field training station and the short course contribute in preparing the new appointee for immediate service, but do not prepare him for future development.

(2) Courses in public health occupying one or more academic years of graduate study meet to a great extent, but not completely, the needs of persons entering public health work. Such academic instruction should be supplemented by actual experience.

(3) Administrative health agencies need to consider seriously the provision of a type of experience comparable to an internship, for those who have had graduate education in public health.

(4) Persons registering for the course leading to the master's degree in public health should already have acquired a professional competence in some field basic to public health work: medicine, engineering, nursing, dentistry. The course itself should be designed as the ground work upon which the graduate will build a career in public health along lines in which he or she has previously acquired a professional status.

(5) For persons without a previously acquired professional competence, but who desire to equip themselves along special lines in public health, courses occupying two to three years should be offered, their completion to be recognized by some degree other than master of public health or master of science in public health.

(6) Though there has been some progress toward coordination of university instruction in public health, courses remain far too departmentalized.

(7) There are probably three major deficiencies, now being corrected, in the teaching of public health administration: these are (a) failure to provide instruction in generally applicable principles of organization, management, personnel relationships, mass psychology, and similar administrative considerations long recognized in the business world. (b) An insufficient orientation of the student as to the effect of social and economic conditions upon public health practice. (c) Too much lecturing and too little dry clinics, too much *ex cathedra* presentation and not enough problems for discussion.

(8) The tendency to have public health nursing education given through teachers' colleges is understandable as regards nurses not prepared to enter upon graduate study. It would probably be more profitable for graduate nurses with college degrees to attend the general public health courses, concentrating their electives in nursing rather than to confine their graduate work to nursing education.

In summary, then, it is seen that the education of public health personnel has made creditable advances in the past twenty-five years. Procedures are not perfect, but most of the deficiencies which exist are known or are becoming recognized, and corrective measures are within reach. Through graduate instruction the young physician, nurse, engineer or dentist who today adopts public health work as a career is better equipped for service to the community and for professional development than has ever before been the case.

DISCUSSION (*Abstract*)

Dr. Felix J. Underwood, Jackson, Miss.—Speaking of education of personnel, I will never forget an experience I had in Mississippi in 1935, when we decided that we would not employ a sanitation supervisor who did not have a bachelor's degree from a recognized institution of learning. I had a friend who was very influential politically and had done a great deal for the work I represent in that State. It would have been a pleasure to do anything in the world that I could for him, without compromising principle. He was the type of man who would do anything on earth for a friend, and he expected the friend to do the same for him when he called upon him.

He came into my office and asked me to employ a nephew of his as sanitation supervisor of his home county.

I said: "He cannot be employed in his home county. Where did he finish college, and when?"

He replied: "He never entered college, much less finished. He quit high school before he was through

and went to work. He is a good worker. That is what you want, isn't it, somebody who will work?"

I said: "Yes, we want people who will work, but it so happens he will have to have a college education."

My friend looked at me with all the scorn that he could command and said: "Do you mean to tell me, Felix, that that boy has got to have a college education to go out and build a privy?"

I talked to him at length of the duties of a sanitation supervisor until he seemed to understand.

The rapid advances in public health work undoubtedly require more urgently than ever before competent and well-trained personnel. It is obvious that no amount of education can ever be substituted for experience in any given field, and the other way around. It takes both. However, the acquisition of knowledge is greatly accelerated through university training. It is good to see that real progress is being made in developing well-rounded courses for those desiring public health careers.

This is a decided advantage over the trial and error system of early public health development. It enables the person with some aptitude and intelligence to gain much more readily the knowledge and experience necessary for efficient public health service. After all, that is what it is all about, to be efficient and to render service of the right kind. Basing his studies upon the accumulated experiences of those who have gone before, the educated man is in a position to analyze the methods and procedures which have proven effective and those which have been found lacking also. In this way he develops a better understanding of public health needs and certainly avoids repetition of many needless mistakes.

I heartily approve the internship period for the public health worker, as for the medical student, immediately following completion of a given course of study. I think this will enable him to get an insight into special health problems and unusual situations which he will not encounter in the regular course of training.

I wish that all medical schools would let the student understand a little about legitimate public health and make him feel that he would prefer to locate and practice in a community that had a good public health program rather than in one that did not, because there is so much that public health can do for the practitioner, and there is much that a practitioner can do for public health.

We have teachers in my State who refuse to teach in a county that has not a good health department. It has come to the point where the best teachers are very open and above board about this.

It may be said that the provisions of the Social Security Act have given more impetus to improvements in personnel training for public health than perhaps any other factor in recent years. The higher standards which have been brought about are reflected in the increased efficiency of the whole public health program. From health officers to the clerical personnel, there is noted new interest and alertness in keeping up with the job. Provision of scholarships here and there seems to have had a stimulating influence all around, in that many workers have undertaken educational improvements on their own, when there is not money enough to go around. On the whole, the prediction for the future seems to be that there can be no letting up of continuous public health training, regardless of how far one may have advanced in any given phase of it.

The manifold complexities of everyday living demand expansion of public health services. This we must be prepared to meet by taking advantage of the many opportunities for study and self-improvement presented each day, and every day there shall be a much easier approach to the public health problems ahead of us. We will be much more likely to solve them if we continue to increase and expand our facilities for health education of personnel, and if we as administrators take full advantage of our opportunities.

I want to say here and now that, in my State, my immediate predecessor, who is here in this room, built a foundation of granite and stone for public health by having laws enacted before I succeeded him. He had laws enacted that made it much easier for us to make rapid progress, because there were no legal obstacles to overcome. We shall ever be grateful to him for making it possible for Mississippi to make the progress it has made in the field of public health. I am referring to Dr. Waller S. Leathers, my immediate predecessor.

Miss Mary J. Dunn, Washington, D. C.—In behalf of public health nursing, I wish to concur in practically all of the points that have been presented by Dr. Mustard and by Dr. Underwood.

We are now taking stock, as it were, and in so doing we realize that perhaps we have not been preparing our nurses very adequately for the field of public health. In light of this fact, we are endeavoring to revise our public health nursing curriculum and to put it on a more practical basis. As a result, we hope to prepare a public health nurse who will function effectively.

Dr. Mustard mentioned that our first public health nursing programs of study were established in teachers' colleges. That is quite true, and we are grateful to those institutions of higher learning which opened their doors to us. However, it is generally believed today that our public health nursing programs of study should be more closely aligned with our schools of public health.

Dr. Mustard mentioned that teachers' colleges have much to offer in the fields of sociology and psychology. While this is quite true, we are not wholly sure that we want the already established courses of sociology and psychology as a part of our public health nursing programs of study, and given *per se*, but rather do we want the inclusion of the sociologic and the psychologic factors with relation to each branch of public health nursing service.

Dr. M. V. Ziegler, Washington, D. C.—I should like to ask Dr. Mustard two questions.

One question has to do with the influence that has been brought to bear on the courses in these various schools by the standards that have been established by the Committee of Professional Education, by the Conference of State and Provincial Health Officers, and those that are about to be established under the merit system with reference to the job description, the educational qualifications for these various public health positions. I have in mind whether the teaching in these schools will be directed into the channels described by the committees.

The other question that I want to pose at this time is one that comes to me from time to time, and that is the school's attitude or the instructors' attitude upon acceptance of individuals who are sent to these schools, and there is a no man's land or a clashing between the educator or instructor in the institution and those of you who are responsible for guiding or selecting various types of individuals to receive professional education. I should like to have your thoughts upon that.

Dr. John A. Ferrell, New York, N. Y.—Eligibility training requirements vary widely among the states and even among the lesser governmental jurisdictions within particular states.

Dr. Mustard mentioned an erroneous opinion he had heard to the effect that the only good public health administrator was a dead administrator. I heard a statement to the effect that a man should not take up administration as a career until he has tried research and failed or ceased to be productive. Like Dr. Mustard, I believe the exceptionally able man should be drawn into the administrative branch of public health, but he should have or should obtain a thorough course of training designed to equip him for his duties.

Dr. Mustard, Miss Dunn and Dr. Ziegler have emphasized that courses of training in the public health field are new, that we are in an evolutionary stage, and that standardization of instruction should not be attempted, certainly not now. Certain broad principles, to be sure, might be adopted. They should represent in part the views of teachers of public health and in part the ideas of the public health workers.

Whether or not any one of the committees mentioned by Dr. Mustard is ideally qualified to specify in the main what should be the content of courses for public health personnel I am not prepared to say. Each undoubtedly has rendered valuable services. Experience may indicate that a new committee, small in size, having selected members from school of public health faculties and from official health organizations, can more effectively advance the program of training personnel. Certainly attempts rigidly to standardize the content of courses should be avoided.

Dr. Carl V. Reynolds, Raleigh, N. C.—Medicine is divided into two fields: preventive medicine and curative medicine. These two branches are so interlocked and interwoven that the success or failure of one depends upon the success or failure of the other.

I think Dr. Mustard meant and really said, that in medical colleges medical students get little information as to the meaning and value and importance of preventive medicine. It seems to me that the success of both preventive and curative medicine depends upon how much knowledge the medical student gets out of preventive medicine while in college. It would change his entire attitude if he realized and appreciated what preventive medicine really is. Having this knowledge, he will be less individualistic and more collectivistic and more sympathetic. The conclusion of the whole thing would be that he would work more cooperatively, and the general population would be better served, and we should all be much happier.

Dr. Mustard (closing).—I quite agree with Miss Dunn that there is considerable difficulty in having students in public health get a great deal out of courses in sociology and psychology, given primarily for some other group. We have not yet developed satisfactory methods of presenting these subjects in graduate public health instruction, and although they are extremely important they have, to a great extent, been neglected.

In the matter of standards, about which Dr. Ziegler asked, and to which Dr. Ferrell referred, I should like to emphasize, which I perhaps did not do clearly enough in my paper, that I do not think it is time, if there ever is a time, for any rigid standardization in the teaching of postgraduate public health work. I think there should be developed instead, more and more clearly, the job demands of the men who are taking those courses, and then through conference between administrators and the persons teaching, we should be able to evolve a satisfactory system of instruction which would meet the demands of the various jobs in public health.

A second question of Dr. Ziegler's was, what would the universities do about admitting men sent by the state health officers. I presume that Dr. Ziegler means in those instances where admissions authorities do not consider the applicant qualified. In general, I think the schools have come to recognize that in most instances the state health officers, and a few city health officers, have exercised excellent judgment in the men whom they have sent; and yet I believe the universities must insist that, regardless of the source from which a student comes, he possess those qualities and potentialities which would make it worth-while to invest this education in him.

In regard to Dr. Ferrell's remarks, I should like first to emphasize that I did not say that the only good administrators are dead administrators, because that would amount to a condemnation of myself. I did not say that. I said that this has sometimes been the academic point of view. Public health administration has not been regarded as a science, and yet the more I dig into it, the more am I convinced that it is a science so complex that we are just beginning to scratch the surface, and discover its underlying principles.

The last thing that I should like to mention is what Dr. Reynolds said. He emphasized that it was extremely important that the medical student get a good understanding of preventive medicine and public health. I heartily agree with Dr. Reynolds. The point that I was trying to make, and am trying to make is that often an instructor who has himself done public health work has a tendency to give medical students a postgraduate course in public health rather than to provide them with the kind of instruction which will inform them, which will provide a perspective of public health which will make them fit into the community work being done in public health. That is why I believe it a serious mistake to attempt to make little health officers out of medical students. Often they go before a bureau director and he spends an hour telling them of his problems as a bureau director. This is useless, non-productive and a waste of time for all parties concerned.

HOUSING OF HEALTH DEPARTMENTS*

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With the progress and development of public health in recent years minimum standards have been formulated for the education, training and experience necessary for employment of all types of public health personnel. Standards have been formulated for many of the various fields of activity, financing and administration, but the question of housing of health departments has been neglected. The federal agencies in their allocation of funds to the states, and the state health departments in their reallocation of funds to local areas, have properly been most solicitous as to personnel qualifications, tenure of office, program and activities, and financing. Both federal and state agencies have been content, however, to leave the arrangements for housing of local health departments in the hands of county commissioners, county judges, mayors and the local health officer. In order to save rent, wherever possible space has been provided in the court houses, usually one or two rooms in a dark corner of the basement or on an upper floor with one or more flights of stairs in varying degrees of repair to be climbed. This has been justified on the grounds of saving rent and utilities, and to associate the health department in the minds of the people with local government. In my opinion, none of these is sufficient justification for housing local health departments in court houses with inadequate space, in an ill-lighted basement, or up stairs which prenatal cases, syphilitic heart cases and tuberculous patients must climb, or young children fall down. Frequently, the nose will lead one unerringly to the court house by the odor of decomposing urine in public toilets; and the floors and walls are stained with tobacco spit from court house loungers. I wonder whether health departments housed in court houses are more often associated in the minds of the public with these elements rather than with the fact that the health department is a unit of local government. Or, perhaps the association is with cheap political activities. I am confident that even the most underprivileged and ignorant, as well as those of better station, are more receptive toward health education and health services where these are offered in clean, attractive, well-furnished surroundings with sufficient privacy than in offices where the opposite is true.

When space is not available in court houses, the next most common procedure has been to rent offices in a downtown building, usually the cheapest possible. It is not beyond consideration that the connection the renter may have with the county judge or mayor more often determines the location of the offices than its desirability as a location for a health department. We have been warned against locating such offices in close proximity to an established individual private physician or group of physicians, because of the fear of the tendency of close association of the health department to a clique. The advantages of such downtown locations are that they are usually readily accessible in a central business district, and tend to be cleaner and better kept than court houses. The disadvantages are that almost invariably they are up one or more flights of narrow stairs, not conveniently arranged for a health department, with insufficient floor space, ill-lighted and poorly ventilated, lacking in toilet facilities, and they are often fire traps.

In recent years, with increases in the personnel of local health departments, there has been a tendency for them to purchase or rent and remodel a centrally located private dwelling. This usually proves quite satisfactory. The living room becomes the waiting room, meeting or special conference room; the dining or front bedroom becomes the medical director's private office; and the other a room for the clerk, records and reports. The kitchen becomes a laboratory or clinic examination and treatment room, or a combination. Remaining bedrooms become offices for nurses, sanitary officers and other personnel. There is, of course, closet space for storage and a toilet. While such headquarters are usually entirely satisfactory, possible objections come chiefly in finding a suitable home in a readily accessible location. The partitions and arrangements may not be optimum for a health department, and the building may not be fitting to the dignity of the department.

In the last few years there has been a marked improvement in both the housing and the supplies and equipment for local health departments in Arkansas, and, I am informed, in almost all of the states. However, it is still true that the great majority continue to be inadequate and unsatisfactory. The improvements have been forced

*Chairman's Address, Section on Public Health, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

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by increases in personnel and functions, and made possible by increasing public and financial support, and to some extent by federal building and public works projects. This brings us to a consideration of the construction of new buildings planned to house health departments. The first question is that of location. Should it be associated with governmental administration? When a new court house is being constructed should space be planned for the health department, or, if a separate building is planned for the health department, should it be placed on the court house grounds? Second, should it be associated with medical care activities, that is, in connection with, on the grounds of, or near a community hospital or outpatient department? Third, should it be by itself, entirely separate from governmental administrative buildings or from medical care institutions? Fourth, and finally, should it be a health center housing all agencies which conduct health activities: the health department, tuberculosis and visiting nurse associations, medical-social welfare agencies and other official and non-official agencies, including perhaps recreational facilities?

The decision as to location with government, medical care, alone, or in a health center, in each case depends upon local circumstances, including the local philosophy of public health, funds available, and degree of coordination with governmental, medical care, or non-official agencies. In every instance, however, the accessibility to the public from the standpoint of transportation must be first, and the health department should be situated on the ground floor unless adequate elevator service is available.

We have in Arkansas examples of every type of housing for local health departments so far described except those in connection with community hospitals as proposed in the President's hospital plan, and the health center. We realize the close inter-connections between local health departments and local government, health departments and medical care, and health departments and non-official agencies, but feel that in general the most practical plan is for a separate building for the health department, even though it be located in any of the places mentioned.

All of the previous discussion of the housing of local health departments applies in a large measure also to the housing of state health departments. We believe, however, that the state health department, at least in Arkansas, is not a direct service agency to the public, particularly in the field of medical care, and therefore, should be established on the state capitol grounds. The provision of adequate quarters will improve both the quality and quantity of work of all personnel, removing overcrowding and interruptions, and will increase the standing and respect of the department. Provision should always be included for future expansion.

The time has come to establish minimum acceptable standards for the housing of health departments to be required before their establishments or as soon as possible thereafter.

PHARYNGEAL AND LARYNGOPHARYNGEAL CANCER*

A NEW COMBINATION OF SURGERY AND RADIATION THERAPY IN THEIR TREATMENT PRELIMINARY REPORT OF FOUR CASES

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and

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The treatment of cancer in this region, by any and all means at our disposal, has been, and still is, unsatisfactory. Because of their widespread ramifications, attempts at complete destruction of such tumors by surgical means has been universally disappointing. Treatment by radiation, in so far as the tumor itself is concerned, has been more encouraging, but the results often have been marred by reason of the fact that normal tissues within the line of fire have been killed. This is followed all too frequently by progressive infection and death of the patient from sepsis and hemorrhage. This process starts with x-ray injury to the laryngeal cartilages and gradually invades the wall of the pharynx by erosion. It is not unusual to see the tumor itself destroyed by radiation, but to our disappointment the cartilage becomes edematous and finally breaks down. This process is likely to persist over a long period and, once present, return to normal is very unlikely. In an effort to avoid radiation reaction of the laryngeal cartilages following radiation therapy for cancer of the pharynx and laryngopharynx, we have removed the normal thyroid and epiglottic cartilages before radiation was instituted. This has been done in four cases and our results up

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*Read in Section on Ophthalmology and Otolaryngology, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

to date are of sufficient interest, we think, to justify this preliminary report.

Case 1.—A 57-year-old white man with a squamous cell carcinoma, Grade III, of the hypopharynx was seen in the wards of the St. Louis County Hospital. The history was that of disturbed deglutition, respiration and phonation, with fifteen pounds weight loss. The lesion involved the external wall of the larynx, the pharynx and the floor of the pyriform sinus on the left side. The jugular glands on the same side were definitely enlarged and fixed. The thyroid and epiglottic cartilages were removed subperichondrially through a mid-line incision on May 8, 1940. Care was exercised to leave the perichondrium. A tracheotomy was done. The arytenoid cartilages were not disturbed. The wound healed by first intention. The lumen of the larynx was practically obliterated for ten days by postoperative edema. The edema then disappeared.

Following the operative procedure, radiation therapy by the Coutard technic was carried out under the supervision of Dr. Sherwood Moore and Dr. Wendell Scott at the Mallinckrodt Institute of Radiology. The patient had a typical and satisfactory radiation reaction of both the skin and mucous membranes, including that of the larynx. This had practically all disappeared on July 27, 1940, when the patient again was brought into the hospital and a careful endoscopic examination was made. The area formerly occupied by cancer was now a smooth white scar with two small areas of ecchymosis in its center. The glands in the neck were no longer palpable. The man wears a small tracheotomy tube, but does most of his breathing through his larynx and has a very good voice. The movements of the larynx are practically normal, although the epiglottis is somewhat curved on itself and lies in a more horizontal position than it formally did. The patient's appetite is good, he feels well and he has regained his weight.

Case 2.—A 71-year-old white man was seen in St. Louis County Hospital Clinic in the spring of 1940. He was complaining of a feeling of fullness in his throat and some difficulty in swallowing. Examination by the indirect method disclosed a large tumor involving the epiglottis. The tumor was about half the size of a golf ball. Biopsy was taken and the diagnosis was squamous cell carcinoma. There were questionable lymph nodes in the neck, but these were not very striking. In addition to his cancer he had evidence of heart damage and he has diabetes. His diet was regulated as well as possible and his blood sugar was brought down to within a reasonable limit. The cartilages of his larynx were removed, leaving the soft tissues, and the epiglottis was removed *in toto*. There was considerable involvement of the base of his tongue, and of course it was impossible to remove all the cancer. This involvement extended over and involved the left lateral wall of the pharynx. Closure was done and a tracheotomy tube was left in place. A nasal tube was used for feeding. His postoperative course was complicated by congestive heart failure. His diabetic situation was kept fairly well in hand with the use of insulin, which had not been necessary prior to operation. His convalescence was rather slow on account of these complications, but he gradually improved to such a point that x-ray therapy was started on August 26, 1940. As in all such cases, there was a tremendous sloughing of the tissues with edema, which cleared up in approximately six weeks. It is important to point out that these patients should be prepared mentally for the procedure they are to go through so as to try to steer them clear of a severe state of melancholia. We had such a problem with this patient and with the patient to follow. After a period of about two months the tracheotomy tube was removed, even though all the cartilages of his larynx were removed at the time of the operation. He is now up and around, comes to the Clinic once a week on his own power, has a fair voice and good breathing space. He had some difficulty for a time in getting fluids down, but on November 12, 1940, he reported that he could swallow milk and water without strangling.

Case 3.—This 56-year-old white man was seen in St. Louis County Hospital Clinic in the late summer of 1940. He complained of difficulty in swallowing, a feeling of fullness in his throat and a loss of weight over a period of several months. On examination with a mirror he had a large tumor involving his epiglottis, which was about the size of a hickory nut. It was difficult to see the vocal cords, but they did not seem to be involved. A biopsy specimen was taken and the diagnosis was squamous cell carcinoma. There was no involvement of the true or false cords. His neck was literally full of glands on each side. On October 8, 1940, a tracheotomy was done, the larynx was skeletonized and the thyroid cartilages were completely removed. The soft tissue of the interior of the larynx was divided and the epiglottis was removed *in toto*. We did not get all the tumor because there was considerable involvement at the base of the tongue, but this was not so marked as in the preceding case. X-ray therapy was started on October 19, 1940, and he is still under treatment. There was marked sloughing at the base of the tongue. This has all disappeared and the mucous membranes are smooth with no evidence of tumor.

Case 4.—The patient had a suspension laryngoscopy December 4, 1933, and a biopsy specimen was taken. She had been hoarse for several months. The biopsy specimen was submitted to a number of pathologists with almost as many conflicting opinions. Dr. James Ewing suggested that the tumor was not benign, but precancerous in appearance. In February, 1934, she had a laryngotomy and diathermy applied to her vocal cords. Subsequent to this she had x-ray therapy with swelling and edema of the neck, which persisted, so that in May, 1934, cartilages of her larynx were removed. Five years later she had a gland in her neck, which was removed, and the diagnosis of this was squamous cell carcinoma. This time she had another course of x-ray therapy. Subsequent to this she had pain in her chest and some elevation of temperature, and it was suspected that she had metastatic cancer of the lung. She was bronchoscoped several times, but a positive diagnosis was never made. Because of the pathologic condition in her neck she did have x-ray therapy to her chest.

Cases 1 and 4 were operated upon by Dr. M. F. Arbuckle.

Cases 2 and 3 were operated upon by Dr. M. F. Arbuckle and Dr. A. C. Stutsman.

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DISCUSSION (*Abstract*)

Dr. Francis E. LeJeune, New Orleans, La.—I have always felt that wherever surgery could be employed in a larynx it was far preferable to deep x-ray therapy

or the Coutard method of radiation. That has been my experience up to the present time.

I have had occasion to see several larynxes which had had an excessive amount of radiation; one I saw in association with Dr. Gabriel Tucker. In spite of receiving large doses of deep x-ray therapy, this particular patient had a recurrence and it was questionable whether surgery would be successful after he had received heavy radiation. A laryngectomy was done and because of postoperative sloughing it was necessary to keep him in the hospital for months. In another such case which had had excessive radiation followed by surgery, practically five months' hospitalization were necessary before healing took place.

That has been my experience with x-ray therapy, and I am glad to hear Dr. Arbuckle tell us about the bright side of it and that he does get good results. Possibly his technician or his radiologist may be using radiation differently from those to whom I have occasion to refer work to. However, the case I just mentioned that Dr. Tucker and I saw together received his radiation in Philadelphia, where the radiologists are unusually skilful.

I should like to ask Dr. Arbuckle whether there are any tricks to the administration of this type of radiation that I could have my men in New Orleans employ to help me just a little bit more, because, frankly, those cases that have been radiated have simply been lulled into a sense of false security and eventually the carcinomatous lesion has recurred. Radiation would be of particular benefit in cases where the lesion is present in the pyriform fossa or in the hypopharyngeal area, the mouth of the esophagus particularly, where these cases are practically inoperable, and I should like to ask Dr. Arbuckle what his experience has been in these cases.

I have not had any experience with the removal of a part of the thyroid cartilage, followed by radiation. I think that brings up a new field, but if radiation does not help out the metastatic glands, then I do not see why it should help the lesions inside of the larynx if the cartilage is removed. That is the first question that occurs to me. I am happy to hear this good report. If we could cure by radiation some of these unfortunate individuals who have lesions in the pyriform fossa particularly, it would certainly be a godsend to them.

Dr. Arbuckle (closing).—Dr. Stutsman, who works with me, has done most of the work in these cases. I am in thorough agreement with Dr. LeJeune's statements that surgery is the treatment of choice when we can destroy any laryngeal tumor by it. Of course, I do not know whether or not the method of treatment just described will later on be thought an improvement; only time will tell. At any rate, we have nothing to lose, because the mortality rate in pharyngeal or laryngopharyngeal cancer has been nearly 100 per cent regardless of the form of treatment used. In all varieties of laryngeal cancer except genuine cordal cancer the mortality still is distressingly high.

I am sure your men, Dr. LeJeune, are just as good as ours. I do not profess to know anything about the technic of radiation. When a patient is getting radiation therapy and his reaction begins to be too severe, we permit him rest for a short time and then start treatment again. We try to make daily observations on these patients with regard to their radiation sensitivity. When we think of classifying tumors by reason of the presence or absence of young or adult cells we often are confused by the fact that during treatment or afterwards the tumor does not behave according to Hoyle.

Jesberg, in Los Angeles, last spring showed a group of county hospital cases (175, I think) in some of which he had been able to secure beautiful results, while in others the treatment was of no benefit. Apropos of the question of radiation versus surgery in selecting treatment, the question often has occurred to me that if radiation therapy will cure the metastasis why would it not have also cured the original lesion, and if so, why not use it first and leave surgery out of the consideration? In order to be clearly understood, I should like to say again that when a tumor can be destroyed surgically, that, in my opinion, is the method of choice for treatment. When there is a doubt then radiation should be used alone or in combination with surgery, but certainly radiation should be used when we are not sure we can get all the cancer, as is possible to do, for example, in cordal cancer.

THE SCIENCE AND ART OF CANCER THERAPY*

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In the uncertain, troublous sea which lies ahead, there is naught we can do beyond striving to keep our ship on even keel. We must take frequent observations and perhaps occasionally turn our prow toward those havens where in former times we have found comparative calm.

For many years we have been worshiping at the shrine of science. That is well and good. She has been a great teacher. Unfortunately, along with our scientific advances, we have often been inclined to forget that we are still dealing with the same type of human beings, that humanity suffers from the same anxieties as formerly, that it possesses the same hopes and fears. The old family doctor was revered largely because of his sympathetic understanding of his patients and his ability to allay their apprehension.

In this day of specialization we have needlessly strayed from his enviable position. This is especially true of cancer therapy. In no other field is the milk of human kindness more needed. Among other things it bespeaks great caution in broaching such a diagnosis to patients. This

*Chairman's Address, Section on Radiology, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

is still true in most cases even though they may say they want to know the truth. At times it would appear that the fear of this disease is the modus operandi by which some hope to increase their emolument for treatment. Many patients, because they believe it incurable, shrink in terror at the thought of cancer. Consequently, if such a diagnosis is abruptly presented to them, they occasionally suffer so much from the mental shock that, for a time, it may seriously interfere with the proper pursuit of therapy. Occasionally we have seen the too honest physician by his positiveness so unnerve patients and relatives that they have turned, sometimes to less competent men, in the search of a more favorable diagnosis. On the other hand, if they are brought gradually to a realization of the nature of their ailment, there is a slow mental readjustment which goes far to mitigate the painful truth. Even after the diagnosis is known, it is often appreciated by patients, if in their presence the word cancer is deleted from the vocabulary.

During the course of treatment and afterward the patient should be kept in as optimistic an atmosphere as possible. The pessimist has no place in the field of cancer therapy. All too often Job's comforters in the form of gossiping relatives, friends and neighbors serve to keep the patient in constant mental turmoil by telling him about others who, of course, had exactly the same condition and were treated in the same manner to no avail. Fortunately, there are usually others who can seem to think only of similar cases which were cured. Their presence calms the patient's fears. Their efforts should be encouraged. Through them the contact of the former with the patient should be made as difficult as possible.

Unfortunately, some physicians seem to think it their bounden duty to be brutally frank with relatives and occasionally with patients as to the gravity of their condition and the final prognosis. They, of course, belong to the group of pessimists. Sometimes they seem more concerned in a demonstration of their ability than in the peace of mind of their patient. Rarely does this frank presentation of what is thought to be the truth accomplish anything in the interest of relatives or patients. Even if this bitter judgment proves infallible, it is often resented by both.

"The undiscover'd country from whose bourne
No traveler returns, puzzles the will
And makes us rather bear those ills we have
Than fly to others we know not of?
Thus conscience does make cowards of us all."

The moving course of events accompanied by an occasional suggestion as to their import will gradually bring all concerned to a proper view of the road ahead with mind prepared.

Since human knowledge at best has very definite limitations, our judgment quite often proves not to be infallible. Who of us has not found his pessimism at times unwarranted, at other times his optimism unfounded? This should always make our spoken prognosis a guarded one, but leaning toward the side of optimism, since too much optimism is usually overlooked, if not appreciated, but too much pessimism is often bitterly resented.

Some years ago an elderly lady of more than 70 years of age with severe dyspnea was referred to us for therapy. She had a type of mediastinal tumor which was exceedingly radiosensitive. Under treatment she recovered very quickly and permanently from her symptoms. Almost immediately we discovered that her relatives had become strangely silent about the referring physician. Obviously they had severed relations with him. Weeks later we indirectly learned the cause. About the time we started the treatment a sister of the patient had died of pneumonia. She was to be buried near the old home more than a thousand miles away. The physician who had been taking care of both sisters had suggested in the interest of economy that they postpone the pilgrimage back home so that a second trip would not be necessary. After she got well, there was so much resentment of the family at the earlier suggestion that the patient might die, as utterly to becloud the thoughtfulness of the physician in trying to conserve their small finances and the merited gratitude at her recovery.

Because of a mediastinal tumor shadow accompanied by backache, a young woman was referred to us with a diagnosis of Hodgkin's disease. The symptoms were not typical, nor was the mediastinal shadow. In fact, our viewpoint of x-ray therapy was largely as a diagnostic aid. Shortly after therapy was instituted the referring physician, unknown to us, was importuned for the diagnosis and foolishly committed himself to a positive statement. She was an unusually intelligent woman and soon found out just what Hodgkin's disease would mean to her. The next day we were confronted with the situation and spent a most uncomfortable half hour trying to repair the damage. It was obvious she had gone through plenty of mental anguish, and quite unnecessarily, as it soon became evident

she did not have Hodgkin's disease. Nothing we were ever able to say could in any way assuage the bitterness which she and her family felt for a formerly revered family physician.

Even though we feel we belong definitely to the class of optimists, we find ourselves now and then quite unprepared for the favorable turn of events. Sometimes we have spoken and thereby displayed our limitations. At other times we have been very thankful that we have held our peace until the turn of events proved our earlier judgment quite erroneous.

Several years ago a very emaciated, anemic man was brought to us for treatment with a diagnosis of carcinoma of the prostate. He had been having severe hemorrhages into his bladder and showed some x-ray evidence of metastasis into his pelvis. The examination had been carried out by a competent urologist. Because of this and the patient's extreme weakness, we accepted the diagnosis and neglected to try to form an opinion of our own. When his wife expressed to us the hope that his life might be spared for five years to help bring up their small children, it was very hard not to utter protest at the thought. As it happened, he made an amazing recovery after a not very intensive course of pelvic therapy and has remained well for more than eight years. Need we say that we look back with much gratitude to the fact that we somehow held our tongue? May we also add that the correct diagnosis in this case is anyone's guess? It certainly was not carcinoma of the prostate.

In spite of this obvious limitation of knowledge, even among those who spend most of their time in the cancer field, there is a tendency in certain quarters to consider some surgical experience and access to a deep therapy machine and radium the open sesame to the field of cancer therapy. This accounts for quite a percentage of the poor results obtained and also explains some of the pessimism exhibited by both patients and physicians. In order to stem the onrush of the hostile forces attacking the present practice of medicine, we must among other things strive to have the therapy of cancer more closely approach the frontiers of knowledge than it does today.

Nearly 20 years ago Regaud, Pfahler and others began pointing out some of the fundamental principles of radiation therapy which are generally accepted today. A little later Coutard began contributing to our knowledge of roentgen therapy. The facts they have elucidated have immeasurably improved our results.

It is generally recognized that carcinoma is most effectively treated by radiation therapy, if the disease-bearing area is gradually raised to a high degree of reaction. Formerly it was thought that the effect was wholly or almost wholly a direct action upon the cancer cells, but in more recent years we have come to feel that the more important part is the changes taking place in the cancer bed. If the treatment is applied gradually over a period of several weeks, a much higher reaction can be brought about and therefore a greater lethal effect on cancer cells can be produced without serious damage to normal tissue, than if the treatment is given more rapidly. In other words, it is the intensity of the reaction produced which tells the story. If the growth has not spread too far and the cancer cells are not too radioresistant, they can be destroyed.

Such a conception unfortunately has failed to permeate some places where radium and x-ray therapy are in use. Often, although the total dose is high, it has been given in an interrupted series of treatments which at no time has produced a very high degree of reaction. If the cancer cells are killed in the first series of treatments, then further therapy can do only harm instead of good. On the other hand, if the first series has not destroyed them, further series of treatments strike a cancer bed which is losing more and more of its power to react. This explains the observation early in the history of radiation therapy that, following repeated nonlethal doses, epithelial tumors of the skin gradually become more and more resistant until finally no dose which has much therapeutic effect can be given safely. If a sufficiently heavy dose has been applied in the first series, it is questionable whether or not a second series can accomplish any good in less than six months to a year. After sufficient time has elapsed, some of the reactivity to radiation is recovered and further treatment may prove worth-while.

The intensity of the radiation reaction which can be safely produced might also be said to bear a more or less inverse ratio to the size of the area treated. This is largely due to the increasing effect of vascular changes as the area becomes larger, although the general systemic effect plays some part. Accordingly, the area to be treated should be kept as small as possible. Sometimes after a fairly intensive reaction has been produced in a region somewhat larger

than is obviously involved, the field can then be advantageously contracted to the definite cancer area and the reaction further intensified.

If cancer is to be cured, patients must often endure considerable discomfort from the effects of radiation treatment. This will be cheerfully borne, if the therapist has gained their confidence and closely observes them during the ordeal. At no time should any of the responsibility for the x-ray therapy be left entirely in the hands of the technician. Frequent examinations should be made and favorable changes should be properly used to build up the patient's morale.

After the treatment is concluded, examinations at short intervals should be continued for a few weeks, followed by less frequent ones over a period of several years. If the patient has not reacted favorably, I can think of nothing more destructive of their morale than the avidity sometimes exhibited in getting the patient back in the hands of the referring physician as quickly as possible. No one likes to take care of a hopeless cancer patient. If we have treated them and gained their confidence, it is our duty to do whatever we can for them.

In these cases we often have to face the question of the use of narcotics. This should, of course, be postponed as long as possible because they have undesirable features at the best. Often the evil day can be delayed for some time by the use of aspirin, occasionally combined with drugs like phenacetin. In some cases snake venom seems to work quite effectively. When narcotics must be given, one should always keep a tight grip on the amount used, as sympathetic relatives are all too prone needlessly to increase the dose. If this tendency is not checked, the dose rapidly mounts with no better relief of pain, but with rapid demoralization of the patient.

In recent years we have relied on dilaudid more and more, chiefly because in our hands its constipating action has seemed negligible. It is usually quite effective in relief of pain and apparently no more habit-forming than morphine. For many years we have failed to see any place for codeine. It is very constipating even in small doses. Since its analgesic action is very weak, the required dose makes it in this respect more undesirable than morphine and more expensive. Its limited effectiveness makes its lessened tendency to habit formation of little moment. Fortunately the radiation therapy which has been given to these patients often keeps the pain pretty well in abeyance until the end, and in these unfavorable cases provides at least that measure of justification for its use.

While this age of science has contributed much in the field of medicine, it has tended to turn our attention away from the art of practice which the old family physician knew so well. In addition, it has furnished us with so many labor-saving devices and short-cut methods that we have gotten in the habit of looking for the easy way. This has doubtless played a large part in the materialism of this age which the physician shares with the remainder of society.

If we are to restore our profession to the honored place it formerly held, we must not only strive to keep in closer step with the scientific advances, but must restore the art of practice as well. We must replace materialism with humanism. In no field of medicine is there a greater need for this than in cancer therapy.

THE DOCTOR AS A TEACHER*

By J. M. T. Finney, Jr., M.D.
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How often have those of us who have some connection with the teaching staff of a medical school been accosted with a statement from a professional brother, "I certainly envy you your teaching opportunity!" This simple pronouncement has several varied applications behind it. It has long been recognized that to teach a subject properly one must have a clear understanding of the fundamental and widely ramifying collateral implications of that subject. In order to give any kind of a lucid exposition, one must have an even more orderly mental concept of the matter to be transferred. One must not only understand it oneself, but must also be able to articulate that knowledge in such a manner that others construct a similar and understandable structure in their own mind's eye. One must not only paint pictures, but also must stimulate the imaginative and creative powers in others to the point where they, in turn, can fill in the accurate detail on the background supplied. A real teacher therefore must be inspired and inspiring, must possess knowledge

*Chairman's Address, Section on Surgery, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

and impart knowledge, must maintain interest and engender interest. In short, if we were to pursue this train of thought much further, he must be such a paragon as to render his genesis doubtful and his survival miraculous. A figure occasionally arises so conspicuously above the common level as to approach this mythical ideal, but if our schools and colleges, universities and medical faculties were to depend upon these alone to fill their teaching staffs, how few would be the institutions of learning and the teachers therein, even in this present day's advanced state of literacy. Certainly most of those of us who can now boast some small teaching connection with some so-called institution of learning would be immediately and automatically consigned to the limbo of forgotten souls.

Let us begin therefore with a simple and frank admission that none of us can hope to be Meigss or Peabodys, McCoshs or Eliots, Pattons or Holmess, Keens or Oslers. These were some of the "greats" of the educational world in the past: we are the rank and file of the present day. But we have a job to do, in our small way, which may affect and be reflected in many lives which pass before us, and come temporarily under our influence. Are we doing the best that we can, each with his own limited capacity and endowment, to instill in these temporary contacts the type of knowledge, the point of view, the vision of profession, service and life, which we, from our experience, can pass on to those who some day will replace us? This is a tremendous and inescapable responsibility, if rightly envisioned and properly assumed, resting on every one of us who are charged with the instruction of youth today. It is summed up in a very few words, it seems to me, in the quotation from Paul, which was the motto of the prep school I attended: "Whatsoever things are true."

Medicine, in the broad sense, is not an exact science. Certain of its component parts, and in some instances, its underlying foundations are, to a greater or lesser degree; but even these can only approach the exactness of the problem exposition in geometry, or the syllogism in logic. Anatomy may be said to represent a reasonably constant structural background in which chemistry and physiology produce certain reasonably predictable reactions and results. Bacteriology and pathology may alter these functions in a reasonably predictable way to produce some fairly constant disease picture. Certain drugs, or some accepted form of treatment may reasonably be expected to combat or modify this disease picture in a certain fairly predictable manner. But there are too many qualifying "reasonablys" and "fairlys" to allow of an assumption of real exactness in any of the above. Medicine is not an exact science; can we then "in truth" teach it as such? There is far too much dogmatism in much of our teaching of the medical student. In our endeavor to present a clear-cut picture of a disease, we leave the impression in our pupil's mind that the picture must be thus and so in this or that disease, and conversely, that unless certain symptomatology is present in its entirety, then a diagnosis of this definite disease cannot be made. What could be further from the truth, and what could be more dangerous to any patient coming under that young physician's care in the future, before he has learned the error of such an assumption? It may be all very well for the teacher to try to paint a very vivid picture in order to impress it upon the mind of his pupil, but there must be proper qualification in the interest of truth, else that unforgotten, unchangeable picture become the albatross around that pupil's neck. I am afraid most of us are too prone to stress the so-called "typical case" to the virtual exclusion of the atypical, and thereby leave a very false impression in our pupils' minds. A toxic thyroid is easy to recognize when there is a visible or palpable struma, with all the classical eye signs, polyphagia, polydypsia, sweating, diarrhea, weight loss, tachycardia, and fatiguability; but how often do we see cases, just as toxic, called neurotic, neurasthenic, psychotic, or even treated for tuberculosis, when of this train of symptoms only the exophthalmos and demonstrable enlargement of the thyroid gland are lacking. And yet this is not a very unusual occurrence. How many times is the often very different symptomatology of the acute appendix lying deep in the pelvis, in contact with bladder, rectum, or both, given in parallel with that of the typical, normally placed appendix? And yet about 20 per cent of appendices lie in the pelvis. Any of us who have been in active practice for some years know these things from experience; but I ask you to think back as to whether you were taught them in medical school, or did some early patient suffer to furnish you with that experience. No, we must get away from dogmatic, didactic teaching of the typical disease picture, and spend more

time with the actual patient, in order to impress upon the student the variability of disease and its manifestations in the human organism. The same is true of treatment, be it medical or surgical. A drug which may effect a cure in one individual, may be a poison to another; an operation which may be proper treatment of a given lesion in one anatomical set-up may be definitely wrong for an entirely similar lesion, but in a different anatomical environment. I have often heard my father quote a trite saying of one of his teachers in surgery:

"There are two words which should not be included in a medical vocabulary: always and never."

That is a truism which is just as applicable today as it was over fifty years ago.

When we are dealing with a group of students, we should remember that the large majority of those men and women expect to go out into private practice; only a few of them will take up institutional work, non-clinical branches, research, or full-time teaching positions. Therefore, we must seek to prepare them to meet people, their future patients, and above all, the families of those patients, in such a way that they, the pupils, may be able to build up a practice and then hold it. This does not depend entirely on the amount of scientific and practical knowledge which we can instill in their minds. Much will depend upon certain of their natural, inherited endowments, which we may call personality. This we, as teachers, cannot hope to produce, or possibly even materially to alter, but we can probably aid in its proper development. We can, however, very definitely instruct them, both by precept and by example, in how properly to approach and handle a patient. Because, of necessity, much of the clinical teaching material in any medical school hospital is drawn from the lowest strata of society, the fact that they are likewise human beings, with at least some of the sensibilities and sensitiveness inherent in "homo sapiens", is often lost sight of. They are regarded merely as examples of a disease picture, rather high grade laboratory animals, and treated as such. The most glaring illustration of such a state of mind was the internationally known German professor of surgery, who, when asked at the conclusion of a cleft palate operation on a totally unanesthetized girl bound to an ironing board type of operating table, why he had not attempted to allay her pain in any way, simply shrugged his shoulders and said "Nicht nötlich", not necessary. Yes, she could be bound and held still, not quiet, but is not the present spectacle in Central Europe but an enlargement of such a point of view? Now we, in this country, have never reached such a perverted state of mind, and God grant that we never will. But when we witness the lack of consideration accorded some of the poor unfortunates in certain free clinics, we cannot repress a shudder at the tendency, and the impression it may make on the minds of such students and young interns as may be present. Is that fitting them for the handling of their private patients later on? The viewpoint and attitude of the man who does, or has done, some private practice is apt to be quite different from that of the one who has spent all his professional life in the laboratory or institutional work. Which one is better able to inculcate in the developing young physician the more useful talents for his later life? The development and fostering of the humane side of a personality, with a sympathetic and understanding attitude, should be a silent, possibly, but ever present part of the curriculum of any medical school.

Mechanization is the universal tendency of this age in which we are living. It reaches into almost every phase and contact of our daily life. The modern house with its automatic heat, mechanically controllable "weather", streamlined kitchen, and self-operating laundry, these are the pride and joy, or envy, of practically every housewife. The modern farm, where intricate machinery has replaced, or is made to care for, most of the domestic animals, and in so doing has reduced the labors, though possibly not the worries, of the farmer to a remarkable degree. The modern mills, where specialized machines, which seem capable of doing almost everything but think, under the control of a single person, may perform operations which formerly required the combined efforts of as many as a hundred individual workers. Examples confront us wherever we look, but many are becoming so common that we take them for granted, unless we stop to think. This same trend toward mechanization may be noted in the practice of medicine, and may well be one of the unrecognized underlying factors which seem to be pushing us toward socialized medicine, or more accurately, possibly, the regimentation of the medical profession under the guise of greater efficiency. I believe that most of you will agree that the close doctor-patient association and mutual under-

standing is a good, and often necessary, foundation to the healing of disease. Do we wish to become, or is it to the benefit of our patients that we should become, mere mechanical pill pushers, or knife wielders? You know how often more good is accomplished by a quiet, unhurried, intimate and sympathetic hearing and examination, than would result from the hurried prescription for any drug in the Pharmacopoeia, or a precipitately proposed operation. In this era of speed and high pressure, it is hard to find time, or at least to bring ourselves to give it, with the result that we are apt constantly to be seeking short cuts, mechanical time savers. There are many of these available, some good, some bad. In our teaching capacities, I am afraid many of us are creating, possibly unconsciously but none the less dangerously, a sense of false values in the minds of our students. We are subordinating the knowledge which may be gleaned by our more or less unaided senses, sight, hearing, touch, yes, and even smell and taste, to the magic of the laboratory, clinical, chemical, pathologic and x-ray. Now I do not mean for one moment to detract from the value of such aids to diagnosis, but I do wish emphatically to insist that we should first of all make full use of our God-given faculties, before falling back upon these adjuncts furnished by science. Among the most valuable qualities capable of development are close and accurate observation, especially of those little things that might ordinarily escape detection by the physician or surgeon not sufficiently alert to take advantage of every opportunity offered. The diagnostic product of this type of mind is often wrongly referred to as "intuition". An observation, so seemingly insignificant that it had failed to attract the attention of others, some fortuitous circumstance, call it chance or luck if you will, may, to the careful clinician, furnish the key to the solution of the problem. Eternal vigilance, together with the ability properly to interpret and evaluate his findings, are the foundation stones upon which are based the reputation that a skilled diagnostician has deservedly earned. Only after one has exhausted all the potentialities of his own senses should the aid of the special laboratory examination or instruments be sought, and then in a subordinate, confirmatory role, rather than as the predominant factor in the final reckoning. The multiplication of special tests or examinations has an additional and very practical side from the patient's point of view also, namely the increase in expense. There are many interesting, though extraneous, observations or tests which might be made on every patient, but many of them are not necessary or indicated in a specific disease picture. There is no excuse for unduly multiplying examinations or expense; such a tendency has brought considerable just criticism to the profession from time to time. Is it not as important a part of our duty as teachers to inculcate this point of view in our students as it is to give them the mere technical side of disease? And by so doing could we not scotch much of the criticism which is given as the reason for bureaucratic control?

In some medical schools there are a few lectures devoted to a somewhat ill-defined subject called medical ethics. In most schools it is not even afforded this doubtful recognition. We hear something of Hippocrates, and less about the Hippocratic oath, and when it is mentioned, it is usually in the same vague, off-hand way that distinguishes most of our citizenry's attitude toward and understanding of the Constitution of the United States. It is a grand document, steeped in tradition and setting forth high ideals in noble language, but what does it say? Why should the discussion of medical ethics, the ethical standards on which they must meet both patients and fellow practitioners, be withheld from our medical students, and hush-hushed much as the discussion of sex and its vital problems are from youth? After all, if we, their teachers, do not supply standards for their later guidance, both by precept and example, their later defections can scarcely be wondered at. This applies not only to the gross irregularities such as criminal abortion, drug peddling, and fee splitting, but of even greater importance, because it is more in keeping with everyday living, to professional dishonesty, petty jealousy, and malicious back-biting of colleagues or competitors. How can there be any lay respect for the profession of medicine, or its practitioners, when the small community is constantly confronted by the spectacle of two of its members who will not even speak civilly to each other when they meet, neither of whom ever speaks of the other except to blackguard him? Or in the larger community where one clique is arrayed against another, almost to the point of open warfare, and separate medical societies are maintained because they

will not mingle even on such common ground? Extreme examples, yes, but not pure imagination. In medical practice, as everywhere else that human beings must live in close association, one with the other, the old adages "In union there is strength", and "A house divided against itself cannot stand" are even more true today than ever before. Recognizing that fact ourselves, let us make an effort to impart this realization to our students just as earnestly as we do the symptomatology of gallbladder disease or the technic of cholecystectomy.

So far we have been concerned mainly with that portion of the medical profession who actually holds some teaching position on a medical school or hospital staff. Of what interest can this be, then, to those who have no such association? To them I would say that they must realize that they also can be teachers, and of equal importance, each in his individual community. They can do a lot toward spreading the spirit of tolerance and cooperation among their professional brethren if they will but make the effort and furnish the example. It always takes two to make a fight, and a one-sided argument will soon die of inertia.

The function of a medical society, as I see it, is to furnish a common meeting place for the discussion and interchange of knowledge and ideas among the members of our profession which should ultimately lead to the betterment of conditions of health and medical practice, through the increase in interest in and understanding of each other's problems and perplexities. This concept applies whether the gathering be a small local county group, or a national or sectional assembly such as this. When any of us attends such a meeting, our presence implies a dual role. We come to exchange ideas, to discuss problems; to give and to take, to teach and to learn. In so doing we not only stimulate our own interest and increase our own store of knowledge and efficiency, but also, by our active participation, we become a teacher in so far as we stimulate our colleagues in like manner. The experience gained in preparing and presenting a paper, however simple, may stand us in good stead at some future time, and its content may furnish just the help that some professional brother was seeking to solve some problem of his own. Your local medical society can become an active, useful post-graduate school, and you a valued member of its faculty, if you will but grasp the opportunity that offers for the taking.

The sphere of influence of these local groups can be immensely widened, however, by extending their teaching efforts beyond the professional membership, and taking in all the lay population. In doing this, each physician becomes his own school and one-man faculty among his particular group of patients. Here indeed everyone of us should be a teacher, and in truth this has been the case. The young expectant mother is taught what to eat, how to take care of herself during the months of pregnancy, so that her baby will be born as strong and healthy as possible. She is then taught how to feed and care for that baby so that it will grow into a normal childhood. She is taught the necessity of a certain amount of cleanliness in the home, of a varied and balanced diet, of sunshine and fresh air, of an uncontaminated water and milk supply. She is taught the advantages of protecting that child from certain possible future diseases by vaccination against smallpox, toxoid immunization against diphtheria and tetanus, inoculation against typhoid and some of the other contagious diseases. That these lessons have been well taught by the physician, and well learned by his patients, is best shown by the virtual elimination of smallpox, diphtheria and typhoid fever, the tremendous reduction in infant mortality and deaths from tuberculosis, and the marked increase in the average life expectancy during the last twenty-five years. There is, however, constantly new work to be done, new information to be spread: the use and efficacy of insulin in diabetes, the significance and necessity for vitamins in the diet, the danger from rabbits, ticks, and unpasteurized milk from untested cows. One could go on at great length, and still not cover the whole field. One particular problem to which we of the Surgical Section of the Southern Medical Association are committed is that of educating the public throughout the south in the recognition of the dangers of an unheeded "pain in the stomach", to the end that we may get an earlier treatment of appendicitis, and a consequent lowering of the death rate. There are without doubt several thousand needless deaths from this disease every year within our territory. Needless, because early recog-

nition of the disease, coupled with early operation performed before rupture and soiling occur means a mortality rate of less than 1 per cent, while operation after rupture occurs raises this figure to an average of about 15 per cent. Of acute appendices coming to operation, probably close to 30 per cent have already ruptured. This means, then, that out of 1000 such cases, 300 will be ruptured, and 45 of them will die, while of the remaining 700 unruptured, only 7 will die. It requires but elementary arithmetic to show that if the percentage of ruptured cases were halved, 20 additional lives in every 1000 cases of acute appendicitis would be saved, or 1 out of every 50 operated upon. Because such a laudable result is directly dependent upon getting the patient to operation before the appendix has ruptured, and because lost time is the most important factor in allowing rupture to occur, and finally because ignorance of this simple fact by the lay public is responsible for a large part of the delay in calling the doctor for cases of persisting abdominal pain, we feel that a great deal of good can be accomplished by a proper and thorough educational campaign. The Central Committee, appointed by this Surgical Section, has in turn, appointed a committee chairman from each of our member states, each state chairman in turn to appoint his own state committee to manage the undertaking in their own state. Most of these details of organization have been accomplished, and the various committees have been at work for some months collecting pertinent data. These will now be used as material for a series of public addresses, both in local gatherings and over the radio, and for controlled press releases, designed to reach every possible resident of our Southern States. It is a tremendous undertaking, and those responsible for its direction will need the whole-hearted cooperation of every member of the medical profession in this vast section of our country. To be effective, it must enlist the services and interest of every member of every county medical society, of every state in our territory. Here, then, is a concrete teaching opportunity for every one of us. Let no one say to another, "I envy you your teaching opportunity". Let us all awake to the realization that this opportunity has always been with us, is now, and always will be, if we will but recognize it as it presents. And then let us each one buckle down and do the best job of which we, individually, are capable,

"You in your small corner, and I in mine."

HISTORY OF THE SECTION ON OPHTHALMOLOGY AND OTOLARYNGOLOGY OF THE SOUTHERN MEDICAL ASSOCIATION, WITH RECOMMENDATIONS*

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The Southern Medical Association owes its inception to the fertile brain of an ophthalmologist, Dr. G. C. Savage, of Nashville, Tennessee. An editorial in the SOUTHERN MEDICAL JOURNAL of October, 1932, is, in part, as follows:

"In the summer of 1906, Dr. G. C. Savage, of Nashville, then President of the Tennessee Medical Association, suggested that members of the Tri-State Medical Society of Georgia, Alabama and Tennessee invite the physicians of Florida, Mississippi and Louisiana to join with them to form an organization to become the Southeastern Branch of the American Medical Association, it having been previously suggested that the National Association have regional meetings. Dr. Savage invited the Presidents of the six Southeastern Medical Societies to meet him in Chattanooga at the annual gathering of the Tri-State Medical Society in October, 1906. The Tri-State Medical Society then went out of existence as such and the Southern Medical Association was organized. . . .

"Dr. H. H. Martin, an ophthalmologist and otolaryngologist of Savannah, the President of the Georgia State Medical Association, was selected the first President of the Southern Medical Association, and he assumed the duties of organizing the component associations of Georgia, Alabama, Florida, Mississippi, Louisiana and Tennessee."

Three sections were decided upon, namely, Medicine, Surgery and Ophthalmology and Otolaryngology. At Hattiesburg, in 1911, it was decided to expand the Association to include the entire South and the District of Columbia.[1]

The organizer of the Southern Medical Association, Dr. G. C. Savage, and its first President, Dr. H. H. Martin, having been ophthalmologists and otolaryngologists, as well as many of its presidents, Drs. Savage, Martin, Cary, Moore, Taylor and Jervey, this Section may lay claim to the title of being the Father of the Southern Medical Association.

The first meeting of the Southern Medical Association was held in Birmingham, Alabama, September 24-25, 1907. This, if you will pardon a personal reference, was my first medical meeting. I had just received my medical degree.

*Chairman's Address, Section on Ophthalmology and Otolaryngology, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

Dr. H. H. Martin, ophthalmologist and otolaryngologist, was the President of the Association, and Dr. L. G. Woodson, of Birmingham, the first Chairman of the Section, with Dr. Oscar Dowling the first Secretary. The following program was presented:

Dr. L. G. Woodson, Chairman's Address; Dr. Samuel Kirkpatrick, Multiple Abscesses of the Frontal Sinuses, Origin, Operation and Recovery; Dr. G. C. Savage, Best Method of Examining Eye Patients; Dr. B. D. Sibley, Acute Suppurative Otitis Media; Dr. A. E. Maumanee, Experimental Work on the Treatment of Trachoma; Dr. P. S. Mertins, subject not given; Dr. Samuel L. Ledbetter, Spectacle Fitting; Dr. G. E. Vaughn, Differential Tests for Heterophoria and Heterotrophia; Dr. Richard McKinney, Teaching Eye, Ear, Nose and Throat Diseases in Modern Medical Schools; Dr. J. McChesney Hogshead, Tuberculosis and Its Channels of Infection in the Eye, Ear, Nose and Throat.

Since its conception in 1906, the Southern Medical Association and this Section have held thirty-three meetings. The following is a list of the officers of the Section on Ophthalmology and Otolaryngology:

1906, Chattanooga—Dr. G. C. Savage, originator; Dr. H. H. Martin, organizer.

1907, Birmingham—Chairman, Dr. L. G. Woodson; Secretary, Dr. Oscar Dowling.

1908, Atlanta—Dr. J. T. Herron, Chairman; Dr. A. B. Harris, Secretary.

1909, New Orleans—Dr. A. W. Sterling, Chairman; Dr. A. B. Harris, Secretary.

1910, Nashville—Dr. E. C. Ellett, Chairman; Dr. A. B. Harris, Secretary.

1911, Hattiesburg—Dr. M. M. Cullom, Chairman; Dr. Richard McKinney, Vice-Chairman; Dr. U. S. Bird, Secretary.

1912, Jacksonville—Dr. M. Feingold, Chairman; Dr. U. S. Bird, Vice-Chairman; Dr. Homer Dupuy, Secretary.

1913, Lexington—Dr. U. S. Bird, Chairman; Dr. Homer Dupuy, Vice-Chairman; Dr. W. S. Manning, Secretary.

1914, Richmond—Dr. Homer Dupuy, Chairman; Dr. W. S. Manning, Vice-Chairman; Dr. K. S. Blackwell, Secretary.

1915, Dallas—Dr. Jos. P. Green, Chairman; Dr. E. H. Cary, Vice-Chairman; Dr. T. W. Moore, Secretary.

1916, Atlanta—Dr. J. W. Jervey, Chairman; Dr. T. W. Moore, Vice-Chairman; Dr. W. T. Patton, Secretary.

1917, Memphis—Dr. T. W. Moore, Chairman; Dr. E. H. Cary, Vice-Chairman; Dr. W. T. Patton, Secretary.

1918—No meeting, influenza pandemic.

1919, Asheville—Dr. E. H. Cary, Chairman; Dr. J. A. Stuckey, Vice-Chairman; Dr. W. T. Patton, Secretary.

1920, Louisville—Dr. J. A. Stuckey, Chairman; Dr. W. T. Patton, Vice-Chairman; Dr. John J. Shea, Secretary.

1921, Hot Springs—Dr. W. T. Patton, Chairman; Dr. H. H. Briggs, Vice-Chairman; Dr. John J. Shea, Secretary.

1922, Chattanooga—Dr. H. H. Briggs, Chairman; Dr. John H. Foster, Vice-Chairman; Dr. John J. Shea, Secretary.

1923, Washington—Dr. John H. Foster, Chairman; Dr. John J. Shea, Vice-Chairman; Dr. H. Marshall Taylor, Secretary.

1924, New Orleans—Dr. John J. Shea, Chairman; Dr. Wm. Thornwall Davis, Vice-Chairman; Dr. H. Marshall Taylor, Secretary.

1925, Dallas—Dr. H. Marshall Taylor, Chairman; Dr. C. A. Bahn, Vice-Chairman; Dr. Edward A. Looper, Secretary.

1926, Atlanta—Dr. R. C. Lynch, Chairman; Dr. John H. Burleson, Vice-Chairman; Dr. Edward A. Looper, Secretary.

1927, Memphis—Dr. Clifton M. Miller, Chairman; Dr. Edward A. Looper, Vice-Chairman; Dr. F. E. Hasty, Secretary.

1928, Asheville—Dr. Edward A. Looper, Chairman; Dr. F. E. Hasty, Secretary.

1929, Miami—Dr. Wm. Thornwall Davis, Chairman; Dr. F. E. Hasty, Vice-Chairman; Dr. Fletcher D. Woodward, Secretary.

1930, Louisville—Dr. Frederick E. Hasty, Chairman; Dr. Bascom H. Palmer, Vice-Chairman; Dr. Fletcher D. Woodward, Secretary.

1931, New Orleans—Dr. Fletcher D. Woodward, Chairman; Dr. W. R. Buffington, Vice-Chairman; Dr. W. D. Gill, Secretary.

1932, Birmingham—Dr. W. R. Buffington, Chairman; Dr. W. L. Simpson, Vice-Chairman; Dr. W. D. Gill, Secretary.

1933, Richmond—Dr. W. D. Gill, Chairman; Dr. E. W. Rucker, Vice-Chairman; Dr. Wm. A. Wagner, Secretary.

1934, San Antonio—Dr. Dunbar Roy, Chairman; Dr. Karl S. Blackwell, Vice-Chairman; Dr. Wm. A. Wagner, Secretary.

1935, St. Louis—Dr. Wm. A. Wagner, Chairman; Dr. R. E. Parrish, Vice-Chairman; Dr. O. M. Marchman, Secretary.

1936, Baltimore—Dr. Millard F. Arbuckle, Chairman; Dr. Grady E. Clay, Vice-Chairman; Dr. O. M. Marchman, Secretary.

1937, New Orleans—Dr. Grady E. Clay, Chairman; Dr. O. M. Marchman, Vice-Chairman; Dr. John R. Hume, Secretary.

1938, Oklahoma City—Dr. O. M. Marchman, Chairman; Dr. Harvey B. Searcy, Vice-Chairman; Dr. John R. Hume, Secretary.

1939, Memphis—Dr. Lawrence T. Post, Chairman; Dr. Harvey B. Searcy, Chairman-Elect; Dr. G. C. Cody, Vice-Chairman; Dr. L. Chester McHenry, Secretary.

1940, Louisville—Dr. Harvey B. Searcy, Chairman; Dr. W. L. Simpson, Chairman-Elect; Dr. Albert L. Bass, Vice-Chairman; Dr. L. Chester McHenry, Secretary.

The Section on Ophthalmology and Otolaryngology has grown of its own volition. There are no definite aims and objects to be striven for, nor are there plans for future developments. We only exist, and grow and grow. This phenomenal existence and growth are due entirely to two things:

(1) We have had capable secretaries, guided by the Council;

(2) There has unquestionably been a great need for this organization in the South.

The requirements for membership into some of the other societies eliminate a great majority of our available membership from them, and yet, those are the physicians who need these associations the most. Some of our members classify themselves as ophthalmologists and otolaryngologists, but augment their income with insurance work, or some other branch of medicine. They fill a much desired position in the smaller communities, and as physicians, are as acceptable to membership in this Section as the ultra-specialized physicians of the medical centers. This, I hope, shall always be the case.

In 1916, Dr. J. W. Jervey, in his Chairman's Address, made three recommendations in regard to the development of the Section, and a committee, consisting of Dr. T. W. Moore, Dr. C. W. Kollock and Dr. J. A. Stuckey, was appointed to

pass upon these recommendations and offered the following resolutions, which were adopted:

(1) That a committee, consisting of the Chairman and Secretary of the Section, be appointed to decide upon the titles and authors of the papers to be presented at the annual meetings.

(2) That each year a symposium or paper be presented before this Section, of which a member, or members, of other sections be invited to participate.

(3) That each year a section dinner be held during the annual meeting.[2]

In 1917, the Chairman appointed a Committee on Trachoma.[3]

In 1919, Dr. Hiram Woods made a motion that a committee be appointed by the Chairman to investigate the publishing of the proceedings in book form. The motion was passed by the Section and referred to the Council.

At the 1921 meeting this Section voted, at the request of the Council, that only one-half day sessions be held.[4]

At this same 1921 meeting, Dr. W. T. Patton suggested that it would be better to have a larger program committee, this work having been done in the past by the Secretary. On motion of Dr. Marchman, duly seconded, the three officers of the Section were appointed the program committee.[5]

At the 1928 meeting, the Council adopted the following rules:[6]

RULES

(1) No name shall appear more than one time as an essayist, or speaker, at any annual meeting on the printed program, nor more than once on the printed program of any section to discuss a paper.

(2) No name shall appear two years in succession before any section as an essayist.

(3) No section shall invite from without the territory of the Association more than one essayist at each annual meeting.

(4) No name shall appear on the nominating committee of any section more than once in five years.

(5) All section officers shall be elected for a term of one year, but the secretary may be elected to succeed himself twice, if the section so desires.

(6) An essayist on the program who fails to appear cannot appear on the program again for two years. Nor can his paper be published in the Journal of the Association.

(7) The privilege and honor of being an orator shall not be accorded to any individual more than once.

(8) It is the opinion of the Council that all papers should be submitted in abstract before acceptance on the programs.

At the 1929 meeting Dr. Clifton M. Miller moved that steps be taken by the officers of this Section to have the title changed to "Section on Ophthalmology and Otolaryngology." The motion was seconded and carried unanimously.[7] That has been the title since 1929.

Dr. William Thornwall Davis, Washington, D. C., read his Chairman's Address entitled "The Prognostic Evaluation of Angiosclerosis Retinae," and following the reading of his address he made the following suggestions to the Section:

(1) That the Section Secretary be instructed to keep a register of all those in attendance at the meetings of the sections.

(2) That the Secretary of the Southern Medical Association, or whoever may be the responsible person, be instructed to keep a list of members of this Section to be kept up to date each year, the Chairman and Secretary of the Section to be forwarded such list of members immediately upon their election.

(3) That the list of those in attendance each year be published in the transactions of the Section.

(4) That the transactions of the sections be published yearly. In these transactions should be published all the papers read before the Section with discussions thereon, together with a list of those in attendance on its session. A special committee should be selected for a study of this question, its cost, etc., to report its findings at the next annual meeting of the Section.

(5) That the Section consider, through a committee, the feasibility of inaugurating instruction courses on eye, ear, nose and throat diseases by members of this Section; such courses to be arranged and modeled after the manner of the Academy of Ophthalmology and Otolaryngology program of instruction as far as may suit the particular needs of the Section. A special committee different from the above should be provided to study this question and report at the next annual meeting of the Section.

(6) Since our Southern states abut upon the Republic of Mexico and are fast becoming very near to that country and to Central and South America, we should consider the feasibility and practicability of a plan whereby those practicing the specialties of ophthalmology and otolaryngology in those countries might be invited to become members, either active or associate, of this Section. It would add to the interest of the Section and would be a progressive step, since air transportation will bring these countries close to us in a few years. A special committee to consider this question and to advise with the officials and Council of the Southern Medical Association should be selected.

It was moved by Dr. Cary that the Chairman be permitted to appoint the various committees mentioned in his suggestions to the Section and that they report back to this Section next year. Motion seconded and carried.[8]

Dr. William Thornwall Davis, Chairman of the Special Committee, reported as follows: "It will be remembered that two years ago this Section, through its Chairman, authorized the appointment of a committee for the purpose of considering the Round Table Postgraduate Instruction Sessions, the publication of the proceedings of the Section, and the relations between the Latin-American Republics and our Association. I was appointed Chairman of that Committee, and divided it into three parts, with a Chairman for each: Dr. E. H. Cary, Dallas, Texas, had charge of the round table sessions; Dr. T. W. Moore, Huntington, West Virginia, the publication of transactions; and Dr. W. D. Gill, San Antonio, Texas, relations with Latin-American Republics. (As far as the round table sessions go, you are aware of what has happened. The Council of the Association has approved these sessions, and I think they are impractical on account of the economic situation and for other reasons. As to the relations with the Latin-American Republics, that is a question for a great deal of study from many angles, and must be considered by the Council of the Association, which I believe is looking into the question now.) For that reason, no further report can be made until the Council acts."

On motion of Dr. J. H. Burleson, San Antonio, Texas, duly seconded, this report was accepted and the Committee continued.[9]

At the 1938 meeting, the special meeting called to discuss the division of the Section, was presided over by the Chairman of the Section, Dr. Oscar M. Marchman, who explained that in the South only 13 per cent of the physicians practicing ophthalmology and otolaryngology limit their practice to ophthalmology; only 16 per cent limit their practice to otolaryngology, while 71 per cent do ophthalmology and otolaryngology. The matter was discussed freely. The group decided that it was best for the Section not to be divided, that it should remain the Section on Ophthalmology and Otolaryngology, and that the Chairman, Vice-Chairman and Secretary as a program committee should group the papers.

At the 1939 meeting, on motion by Dr. Murdock S. Equen, Atlanta, seconded by Dr. Frances E. LeJeune, New Orleans, it was voted that hereafter the Section, besides holding the morning sessions, should also hold round table discussions on the Wednesday and Thursday afternoons, one afternoon on the eye and the other on the ear, nose and throat.

There being no executive committee to take this question up before the Council in regard to using both Wednesday and Thursday afternoons for instructional courses or round table discussions, the Chairman presented the matter to Mr. Loranz, Secretary-Manager, and it was agreed upon that one afternoon be used again this year, its popularity to be watched and further action taken.

After studying the history of this Section and the recommendations previously made pertaining to administrative matters, I sent a letter and questionnaire to the past chairmen and was, indeed, gratified at the interest taken by these men. All agreed upon the need for an executive committee, to act upon questions pertaining to this Section alone, and also to go to the Council with matters that might require the sanction of the Council. All agreed that there should be an improvement upon the method of electing the officers of the Section, more time being needed by the nominating committee to deliberate upon this important duty.

All were enthusiastic over the round table sessions, or instructional lectures, to be held upon both Wednesday and Thursday afternoons. Many suggested that the papers presented at the meeting be more of the clinical type and less of the theoretical, research laboratory type, which had to be read to digest.

Therefore, I wish to present to the Section the following recommendations:

(1) The appointment of an executive committee. In my opinion this committee should be of the following personnel:

(1) The chairman

(2) The chairman-elect

(3) The vice-chairman

(4) The immediate past chairman

(5) Any member of the Council who happens to be a member of this Section (Dr. E. W. Rucker at present)

(6, 7, 8) Three members elected from the floor, one being elected each year for a period of three years.

This would give an executive committee sufficiently small to transact business and large enough so that one or two absentees would not be a handicap.

(2) That the nominating committee be composed of five members. That the chairman-elect be ex-officio chairman of this committee. That the Chairman of the Section appoint the other four members of the Committee the first morning of the meeting, and when possible notify these members in advance that they will be appointed. Rule four, passed by the Council in 1928, reads as follows and must be adhered to:

"No name shall appear upon the nominating committee of any section more than once in five years."

(3) That the executive committee request of the Council permission for this Section to have a round table discussion or instructional lectures upon both Wednesday and Thursday afternoons, one afternoon being limited to ophthalmologic subjects and the other to otolaryngologic sub-

jects. That the executive committee be authorized to take what steps it deems advisable to make these afternoons a success: to appoint a secretary, to select the leaders, to devise a method of financing the expenses to be incurred separately from the Southern Medical Association, and any other matter necessary.

(4) That the executive committee take up with the Council the question of procuring a list of the members of the Southern Medical Association who classify themselves as members of this Section, and a list of those in attendance at the meetings; that these lists be furnished the Chairman and Secretary as soon as possible after the meeting.

(5) That the executive committee and Secretary, instead of just the Chairman and Secretary, be responsible for procuring essayists for the meetings, thereby giving the overworked secretary more assistance.

(6) It has been customary to have a guest speaker. At first we had only one guest speaker; then we were allowed to have one for ophthalmology and one for otolaryngology. These guest speakers have been selected from without the territory of the Southern Medical Association.

I recommend that instead of having guest speakers that we have honor speakers, thereby making it convenient to honor members of our Section or territory. I suggest that such a name as "The G. C. Savage Address," honoring the originator of the Southern Medical Association, be the title given to the address in ophthalmology and "The H. H. Martin Address" be the title given to the otolaryngologic address. I suggest that the executive committee consider this question.

To be selected to make the principal address before this Section is an honor, indeed, and there are men within our own territory who deserve this honor and recognition. The title of the address should be so worded as to make the addresses known as the special features of the meeting.

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Southern Medical Journal

JOURNAL OF THE

SOUTHERN MEDICAL ASSOCIATION

Copyright, Southern Medical Association, 1941. Published monthly by the Southern Medical Association, Empire Building, Birmingham, Alabama. Annual subscription, $4.00. Single copies, 35c each.

Entered as second-class matter at the Post Office at Birmingham, Alabama, under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized December 20, 1921.

M. Y. DABNEY, M.D., Editor
C. P. LORANZ, Secretary, Treasurer and General Manager

Volume 34 FEBRUARY 1941 Number 2

EDITORIAL DEPARTMENT

SOUTHERN MEDICAL ASSOCIATION
Thirty-Fifth Annual Meeting
St. Louis, Missouri, November 11-14, 1941

MARCUS PINSON NEAL

PRESIDENT-ELECT OF THE SOUTHERN MEDICAL ASSOCIATION

When the Section on Pathology of the Southern Medical Association was organized at the Washington meeting in 1923, it made the fourteenth specialty of the membership. The Association was organized in 1906 with three sections, which were sufficient for a period of five years: medicine, surgery, and eye, ear, nose and throat. Public health, pediatrics, obstetrics, railway surgery and gastro-enterology were soon added. Radiology preceded pathology in official recognition.

The beginnings of the special sections roughly parallel the increase in number of Southern physicians who limit their work to a particular specialty. Pathology, the most fundamental of the sciences, is perhaps the product of an older medical culture; it certainly does not go with the era of the horse and buggy doctor. As a specialty in the South it is not much more than eighteen years old, since only the last two decades have required widespread installation of paid pathologists in staffs of hospitals of repute.

The new President-Elect of the Association is the first pathologist who has held this office. Previous presidents have represented most of the specialties except pathology. Dr. Neal will also be the first Missourian to become President.

Marcus Pinson Neal is an Alabamian by birth. He was born in Heflin, in 1887, near the Georgia border. His mother was Ella Jane Pinson Neal. His father, William Alexander Neal, was practicing medicine in Heflin at the time of Pinson's birth. Later, impaired health caused him to enter the lumber business, but he retained his interest in medicine and physicians.

The President-Elect attended the University of Alabama and later was graduated from the University College of Medicine, now the Medical College of Virginia, in Richmond, in 1912. From that time until America entered the World War, he held various positions in clinical pathology and bacteriology in his alma mater in Richmond; in Asheville, North Carolina; in Chicago in the Board of Health Laboratories, and in Northwestern University Medical School.

In 1917, he married Mathilde Frances Evers, of New York City, and they have a son, Marcus Pinson, Jr.

The President-Elect served as first lieutenant, captain, and major in the Medical Corps of the United States Army with the American Expeditionary Forces in France. A citation was awarded him by General John J. Pershing, for conspicuous and meritorious service with the troops in France.

After the war he returned to his position in the department of pathology at Northwestern University Medical School, and in 1920 became assistant professor of pathology and bacteriology in the University of Iowa Schools of Medicine and Dentistry. He accepted the chair of pathology in the University of Missouri School of Medicine in 1922, where he has remained to the present time. He has numerous hospital connections.

In 1926, he joined the Southern Medical Association and has missed few meetings since that time. He has been Secretary, Vice-Chairman and Chairman of its Section on Pathology, Chairman of its Section on Medical Education and Hospital Training, and Councilor from Missouri for a number of years, Chairman of the Council in 1935-1936, and has done much to interest physicians in his State in the Association. Also he has been active in a number of other medical organizations and movements.

In his State he is a member of the committee on the study of medical practice laws; on postgraduate medical courses; on dissemination of knowledge of appendicitis among the laity, and

he has been president of his local county medical society. He has been president of the Mississippi Valley Medical Society, and was the recipient of its distinguished service award in 1940. This was given in recognition of "splendid teaching, conscientious and valuable research, together with sterling character." Of course his membership in a large number of scientific societies goes without saying.

His contributions* to medical literature have been numerous and of outstanding quality, and he has attained wide recognition among pathologists. He has added considerably to the sum of knowledge of his specialty.

Above the average as a speaker, he is also well informed and studious. His energy is unbounded and uncontrollable, and sooner or later he is found taking over most of the work of almost any committee upon which he serves. He is a democrat, a Presbyterian, a thirty-second degree Mason and an enthusiastic hunter and fisherman. If a medical barbecue is given, he is a marvelous artist at arranging the entertainments and personally supervising the barbecuing of much fine meat, which he enjoys carving and serving to the guests. Kindly toward everyone, with a wide acquaintance, he is a good mixer.

The Southern Medical Association is perhaps entering upon a difficult year, but is blessed with superb leadership. It is fortunate to have Dr. Neal's standards of scientific and civic work as a light before it, and as a further guarantee of a successful and progressive year in 1942.

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SUSCEPTIBILITY TO SULFANILAMIDE

A considerable number of toxic reactions to sulfonamides have been reported clinically, with detailed studies of many of them. Their occurrence has been unpredictable in the particular cases, and the causes are not understood. Smith[1] and associates of the United States Public Health Service have attempted to discover factors which might influence the occurrence of injury from administration of these drugs.

They investigated the effects of various preliminary diets upon the reactions of rats to sulfanilamide to determine whether any particular ration could reduce the susceptibility to sulfonamide injury. The rats were kept on simplified diets of casein and cornstarch with brewer's yeast, a salt mixture, cod liver oil and olive oil, that is, a low protein but otherwise presumably adequate diet. Certain groups of animals received in addition to this list, to increase the protein

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1. Smith, M. I.; Lillie, R. D.; and Stohlman, E. F.: The Influence of Dietary Protein on the Toxicity of Sulfanilamide. Public Health Reports, **56**:24 (Jan. 3) 1941.

content, an amino-acid, cystine; another group received cystine plus a sulfur bearing amino acid, methionine; and a third group received a high protein diet in the form of 30 per cent casein. They were kept on these rations for about a month; then sulfanilamide was administered into the stomach daily over a period of about a month.

One-third to half the animals died in all groups except the last, the group which received the basal diet plus 30 per cent casein. In this group no anemia was detected. Many very anemic animals were noted in the other groups. The animals which received the amino-acid supplements made good weight gains throughout the period of treatment. The animals in the low protein group tended to maintain a higher sulfanilamide concentration in the blood.

At necropsy, signs of liver injury were apparent in the low protein group, both those which had had and those which had not had sulfanilamide. All livers of the amino-acid-sulfanilamide group were normal. Slight kidney changes were noted in a number of the sulfanilamide treated animals regardless of ration. Fat-free calcareous concretions were observed in the convoluted tubules in a number of the low protein animals. These did not appear in the methionine treated group. Sulfanilamide apparently had nothing to do with this particular kidney injury. It was a low protein injury, perhaps specifically benefited by the amino-acid methionine.

A number of investigations have been made upon the effect of diet upon the reaction of an animal to poisons. One of interest reported a few years ago was that of Minot,[1] of Vanderbilt, upon the reaction of dogs to carbon tetrachloride, an anthelmintic. Occasionally this drug, after large scale administration to human beings, has caused fatalities. Minot and his associates administered it to dogs which had been maintained upon three different diets as follows: (1) high protein; (2) high carbohydrate; and (3) high calcium. It was noted that the high calcium ration had a protective effect against toxic reactions to carbon tetrachloride, particularly against the liver injury. The effect was the same whether calcium was administered as bones, milk or inorganic calcium salts. This akaline earth was thus good for the liver.

Calcium would seem to be low in many popular dietaries. If one should just now eat all the minerals, vitamins, proteins and fats, milk, eggs, butter, citrus fruits and leafy vegetables, which are believed to be deficient in the usual dietary (carbohydrates are the only great class of foods not on a current crest of laboratory popularity) just the thought of it might cause him to swell up and explode.

However, the practitioner in Southern territory should keep the eating tendencies of his patients always in mind, and recall that the average Southern dietary is greatly deficient in many life-saving and health-promoting foods. This is necessarily true because of the low per capita income of the Southeastern states. In Alabama, for example, figures given in 1929, a presumably good year, show a per capita income for the non-farm population of $527 per year; for the farm population of $141 per year, making an average of $331 per year for the State.[1] Odum groups North and South Carolina, Virginia, Kentucky, Tennessee, Georgia, Alabama, Mississippi, Louisiana, Florida and Arkansas together as similar economically. How can incomes of this size, which are typical of the region, provide fresh meat, milk, eggs, fruits and other foods of high biologic value?

The tendency of the poor in the South, and most of the South is poor, is to corn meal, white flour, molasses and fat salt pork, or a diet not sufficiently different from this basic one to support the best of health; and this should be considered in medication of the large majority of the persons who become ill in this part of the country.

It will be well to inquire closely into the eating habits of the patient who is receiving any of the sulfonamides, and to prescribe insofar as possible a liberally protective ration.

From the work in the United States Public Health Service, a high protein diet might be helpful in reducing sulfanilamide reactions.

TUMORS AND ESTROGENS

Considerable control of hormones over tissue growth has been noted, and in particular the production of fibroid tumors of the uterus by estrogens was reported some years ago. Investigators[2] from the National Health Service of

1. Minot, A. S.: Relation of Calcium to the Toxicity of Carbon Tetrachloride in Dogs. Proc. Soc. Exp. Biol. & Med., **24**:617, 1927.

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Chile have studied the localization of these tumors in the uterus and outside it in estrogen-treated guinea pigs.

Continued administration of very small quantities of any of the estrogens caused fibroid tumors, which were variously scattered in the uterus, were large or small or pedunculated, and might also occur in other parts of the body. Estrogen tablets introduced under the skin at times produced tumors as early as within three weeks.

In a group of several hundred guinea pigs treated with ten different estrogens, subserous tumors were found on most of the abdominal organs: the stomach, pancreas, liver, kidney, abdominal wall, and diaphragm. They had no connection with the lymph nodes. No thoracic tumors were found, and no tumors were found at the site of injection or implantation of the stimulant.

This is an interesting contribution to the etiology and distribution of tumor growth.

TWENTY-FIVE YEARS AGO

From Journals of 1916

War Profits in Germany.[1]—The Krupp family of Essen has donated fifty million marks ($12,000,000), representing the increase in profits, the net result of the war, for civil betterment work.

Food in Germany.[2]—The manifesto issued by the government regulating the price and distribution of foods and food products appears to have created the impression that Germany is hungry or that such a state of affairs is imminent. How little truth there is in statements based on such belief is shown by consulting the price lists issued in Berlin. * * * The government regulation of food prices is of immense value to the people. * * * The average price per 100 pounds of living calves fell from 94 marks ($23.50) to 77½ marks ($19.37) during the week of October 25-30 * * * for pigs from 145 marks ($36.25) to 102½ marks ($25.62); for one pound of butter it fell from 2.77 marks (69.25 cents) to 2.53 marks (63.25 cents).

Muscle Testing in Infantile Paralysis.[3]—* * * Infantile paralysis has been shown in most muscular groups not to be a paralysis in the sense of complete loss of power, but a weakening of those muscles. * * * It became imperative to have some scale by which to work out what should be a precise and improved treatment. The muscle test offers a practical quantitative scale by which the effects of modifications of treatment may be studied week by week and month by month. * * * The muscle test devised consists of estimating the strength of the various muscle groups by means of spring balances. * * * The general relation of the strength of the various muscles in children is surprisingly constant.

Book Review.[4]—The Clinics of John B. Murphy, M.D., at Mercy Hospital, Chicago. Philadelphia and London: W. B. Saunders Co., 1915.

Among a great variety of interesting topics they contain many bone cases, in which line Dr. Murphy appears at his best. However, like all the great Doctor's writings, they abound in dogmatic statements which are matters of his own personal opinion. For instance, take the almost amusing statement that a keloid in a white woman was due to the fact that she had been nursed at the breast of a negro "Mammy". The natural inference is that had she received cow's milk instead she might have grown horns. * * * No surgeon can afford to miss Murphy's Clinics.

1. Berlin Letter, J.A.M.A., **66**:45, 1916.

2. Ibid.

3. Lovett, Robert W.; and Martin, E. G.: Certain Aspects of Infantile Paralysis. J.A.M.A., **66**:729, 1916.

4. Book Review. Sou. Med. Jour., **9**:282, 1916.

Book Reviews

The Practice of Medicine. By Jonathan Campbell Meakins, M.D., LL.D., Professor of Medicine and Director of the Department of Medicine, McGill University. Third Edition. 1430 pages, illustrated. St. Louis: The C. V. Mosby Company, 1940. Cloth $10.00.

Dr. Meakins is a brilliant writer and speaker, and this work represents the painstaking labor taken to compress into one volume, without omitting essentials, the present day knowledge of the practice of medicine. As an example, the subheadings under bronchopneumonia are: synonyms, definition, causative agent, incubation period, portal of entry, predisposing factors, manner of onset, signs of general infection, symptoms, signs, secondary lesions, pathological anatomy, diagnosis, course and termination, and treatment. All padding is omitted and unproven theories are given scant space. So much ground must be covered that even with these omissions the book is large, 1,430 pages. Space must be conserved for essentials and Dr. Meakins does this, the only concession being in the free use of illustrations, and these also seem essential as he uses them. It would be difficult to overestimate the value of the illustrations which are used liberally, and color plates where color is the essential feature as in skin reactions and throat conditions. And speaking of color, one cannot omit mention of the paper on which this book is printed. It is a very light green to obviate glare and reduce eye strain. Under a bright light the relief to the eyes is remarkable with this innovation.

There is a chapter on the value and the limitations of electrocardiograms. The vitamins are covered as to their specific effects, but little space is taken up with their unproven possibilities.

Very interesting are the chapters on diseases due to abnormal environments and diseases due to chemicals and drugs. One thousand pages are taken up with the common diseases under the various system headings: heart,

lungs, allergy, urinary infections, nervous and ductless glands.

Dr. Meakins' literary style fits in admirably with a work of this scope. It is easy flowing, as concise as the subject will permit, but withal entirely comprehensive. The entire work has been revised.

A Manual of the Common Contagious Diseases. By Philip Moen Stimson, A.B., M.D., Assistant Professor of Clinical Pediatrics, Cornell University Medical College. Third Edition. 465 pages, illustrated. Philadelphia: Lea & Febiger, 1940. Cloth $4.00.

This book is a compact and authoritative discussion of eleven common contagious diseases: diphtheria, Vincent's angina, scarlet fever, measles, rubella, whooping cough, mumps, chickenpox, smallpox, meningococcus meningitis and poliomyelitis. This revision contains new material on virus diseases, the use of chemotherapy as sulfanilamide and sulfapyridine, on whooping cough, meningitis, scarlet fever and measles. The colored photographs add to the value of the text, as they are exact in their depiction of the lesions.

The present edition gives to the practitioner a safe guide to the handling of these diseases, including the medication, and the precautions that should be taken to prevent their spread.

Germs and the Man. By Justina Hill, Associate in Urology, Medical School, the Johns Hopkins University. 413 pages, illustrated. New York: G. P. Putnam & Sons, 1940. Cloth $3.75.

In this book is told the story of man's fight against infection, the behavior of bacteria and the bodily defenses against them. The first part of the book deals with bacteria. Of particular interest is the account of the manner of infection and the control of such major infections as syphilis, tuberculosis, gonorrhea, meningitis and tetanus. The more recent advances in immunology are lucidly described and will help greatly in clearing up the prevailing bewilderment of the layman. The story of wound healing is excellent. The concluding chapters unfold in a fascinating way the strides made in chemotherapy to the present date. The information supplied in this book is accurate and the literary style is charming. This book will make a valuable addition to the library of the physician and may be recommended for consumption by the layman.

An Anatomical Analysis of Sports. By Gertrude Hawley, M.A., Formerly in Charge of Physical Education for Women at Northwestern and Stanford Universities. Author of the Kinesiology of Corrective Exercise. 191 pages, illustrated. New York: A. S. Barnes & Co., 1940. Cloth $3.00.

This book explains the anatomical and physiologic basis for the selection of correct "forms" to be used in various types of athletics.

The explanation of these technics has been presented in an effort to adapt athletic programs to individual needs, and to coordinate maximum athletic efficiency with safety to the body mechanism.

The analysis of the typical positions and movements involved in these sports has been written more for the benefit of coaches and teachers than for physicians.

Southern Medical News

ST. LOUIS CLINICS

The St. Louis Clinics will hold its Annual Clinical Conference at the Coronado Hotel, St. Louis, March 10 through March 13. The morning of March 10 will be set aside for registration, the program beginning at 1:00 p. m. The clinics are conducted by St. Louis physicians. Seven distinguished speakers from outside the St. Louis area will participate in the program, and there will be special subjects presented by Reserve Officers of the Army and Navy. The program offers an opportunity for concentrated postgraduate work to physicians from the South and Southwest. For program and further information write to the St. Louis Clinics, 3839 Lindell Boulevard, St. Louis, Missouri.

NEW ORLEANS GRADUATE MEDICAL ASSEMBLY

The New Orleans Graduate Medical Assembly, fifth annual session, will be held at New Orleans, March 3-7. The program contains the names of some eighteen outstanding physicians as essayists. In addition there will be round table luncheons each day. The last day, March 7, will be given over to clinics in the hospitals of New Orleans. There is a registration fee of $10.00. Dr. Val H. Fuchs is President; Dr. Joseph S. D'Antoni, Secretary; and Dr. Wm. H. Gillentine, Treasurer. For program and information. address the Secretary, 1430 Tulane Avenue, New Orleans, Louisiana.

MID-SOUTH POSTGRADUATE MEDICAL ASSEMBLY

The Mid-South Postgraduate Medical Assembly, fifty-sixth annual session, will be held at Memphis, Tennessee, February 11-14, at the Hotel Peabody. The program consists of twenty-four guest speakers with round table luncheons at noon each day. Dr. J. L. Dunavant, Ripley, Tennessee, is President; Dr. C. W. Speck, New Albany, Mississippi, President-Elect; and Dr. A. F. Cooper, 165 Madison Avenue, Memphis, Tennessee, Secretary-Treasurer.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

A meeting of the American Association for the Advancement of Science, organized in cooperation with the American Society of Parasitologists, American Society of Tropical Medicine and the National Malaria Committee, was held in Philadelphia, December 30, 31 and January 1. A Symposium on Human Malaria was presented which contained some forty papers on this subject, many by men who are members of the Southern Medical Association.

ALABAMA

Medical Association of Alabama will hold its next annual meeting in Mobile, April 15-17.

Jefferson County Medical Society has elected Dr. M. Y. Dabney, President; Dr. Ivan C. Berrey, Vice-President; Dr. John W. Simpson, member of the Board of Censors; and Dr. J. M. Mason, member of the Library Board, all of Birmingham.

Dr. Duward O. Wright, Fort Payne, and Miss Harriet D Harton, Conway, Arkansas, were married October 5.

Deaths

Dr. W. W. Harper, Selma, aged 73, died January 14.

Dr. Charles J. Ayres, Newbern, aged 70, died November 12.

Dr. Claude Bell, Tuscaloosa, aged 64, died November 3.

Dr. Joel Herbert Carter, Castleberry, aged 59, died in November.

Dr. James Griffin Elrod, Dutton, aged 82, died October 29.

Dr. William Bedwell Harrell, Sr., Thomaston, aged 59, died in October.

ARKANSAS

Arkansas Medical Society will hold its annual meeting in Little Rock, April 14-16.

Bradley County Medical Society has elected Dr. W. B. Reasons, Hermitage, President; Dr. Rufus Martin, Warren, Vice-President; and Dr. W. J. Hunt, Warren, Secretary-Treasurer.

Continued on page 40

when appetite lags....

employ this elixir of natural B-complex and glycerophosphates

For the anorexia and sluggish digestion so frequently encountered during the winter months, Elixir 'B-G-Phos' offers a stimulating and exceptionally pleasant tonic combining the advantages of the entire B-complex from *natural sources* with glycerophosphates.

Elixir 'B-G-Phos' includes Vitamins B_1, B_2, and B_6 together with the filtrate factor, nicotinic acid, and other natural factors of the entire B-complex, combined with the glycerophosphates of calcium, sodium, potassium, and manganese.

Elixir 'B-G-Phos' not only tends to correct B-complex deficiencies but stimulates the appetite and helps to reestablish intestinal motility. Thus, disturbances of elimination are corrected and digestive functions are improved.

Elixir 'B-G-Phos' is supplied in pint and gallon bottles.

One Tablespoonful
Three Times a Day before Meals

Elixir 'B-G-Phos'

Sharp & Dohme

Continued from page 238

Craighead-Poinsett County Medical Society has elected Dr. M. E. Blanton, Jonesboro, President.

Faulkner County Medical Society has elected Dr. L. L. Hassell, President; Dr. E. L. Dunaway, Vice-President; and Dr. J. S. Westerfield, Secretary-Treasurer, all of Conway.

Hempstead County Medical Society has elected Dr. J. E. Gentry, McCaskill, President, and Dr. Jim McKenzie, Hope, Secretary-Treasurer.

Independence County Medical Society has elected Dr. J. J. Monfort, Batesville, President; Dr. I. M. Huskey, Cave City, Vice-President; and Dr. W. J. Ketz, Batesville, Secretary-Treasurer.

Jefferson County Medical Society has elected Dr. Fred Hames, Pine Bluff, President; Dr. J. W. John, Pine Bluff, Vice-President; and Dr. A. R. Russell, Earl, Secretary-Treasurer.

Johnson County Medical Society has elected Dr. I. M. Kolb, President; Dr. R. H Johnston, Vice-President; and Dr. G. R. Siegel, Secretary-Treasurer, all of Clarksville.

Mississippi County Medical Society has elected Dr. J. T. Polk, Keiser, President; Dr. T. K. Mahan, Blytheville, Vice-President; and Dr. F. D. Smith, Blytheville, Secretary-Treasurer.

Nevada County Medical Society has elected Dr. I. B. Hesterly, Prescott, President; Dr. G. G. Hairston, Monticello, Vice-President; and Dr. L. J. Harrell, Prescott, Secretary-Treasurer.

Polk County Medical Society has elected Dr. B. M. Hawkins, President; Dr. H. G. Heller, Vice-President; and Dr. J. G. Hilton, Secretary-Treasurer, all of Mena.

Pulaski County Medical Society has elected Dr. E. H. White, President; Dr. Alan G. Cazort, Vice-President; and Dr. T. Duel Brown, Secretary; and Dr. R. J. Calcote, Treasurer, all of Little Rock.

Sebastian County Medical Society has elected Dr. Hugh Johnson, President; Dr. H. C. Dorsey, Vice-President; Dr. W. F. Adams, Secretary; and Dr. W. R. Brooksher, Treasurer, all of Fort Smith.

St. Francis County Medical Society has elected Dr. N. C. McCown, Forrest City, President; Dr. M. L. McLendon, Palestine, Vice-President; and Dr. J. O. Rush, Forrest City, Secretary-Treasurer.

The new county health building at Pine Bluff has been named the W. H. Bruce Building in recognition of the work of Dr. Bruce in Jefferson County.

Dr. Ralph Hamilton is erecting a clinic building in West Memphis.

Dr. J. O. Rush, Forrest City, has been elected Vice-President of the Arkansas Society for Crippled Children.

Dr. A. K. Wayman, Little Rock, has been appointed Superintendent of the Pulaski County Hospital.

Dr. W. J. Blackwood, Rector, Dr. C. L. Harris, Melbourne, and Dr. H. O. Walker, Newport, have been appointed county chairmen in the Fight Infantile Paralysis campaign.

Dr. E. M. Nixon, formerly Health Director of Mississippi County, has become associated with Dr. Joseph F. Shuffield at Little Rock.

Dr. Joe F. Rushton, Magnolia, has been elected a Director of the Hospital for Crippled Adults at Memphis, Tennessee.

Dr. Ralph E. Weddington has been transferred from Melbourne to Batesville, where he will be Director of the Independence County Health Unit.

Dr. M. C. John, Stuttgart, has been reappointed a member of the Board of Trustees of the State Sanatorium.

Dr. O. G. Hirst, Prescott, Dr. T. L. Adair, Bald Knob, Dr. James W. Branch, Hope, Dr. B. P. Briggs, Little Rock, Dr. H. D. Fowler, Little Rock, Dr. Elmer J. Ritchie, North Little Rock, and Dr. T. S. Van Duyn, Stuttgart, have reported for active duty with the Medical Corps, United States Army.

Dr. J. D. Huskins, Siloam Springs, has been called to active duty with the Army Medical Corps and assigned to the 48th Medical Battalion, 2nd Armored Division, Fort Benning, Georgia.

Dr. Jeff J. Baggett and Miss Frances Gose, both of Prairie Grove, were married October 26.

Dr. F. M. Burton, Hot Springs National Park, has been called to active duty with the Army Medical Corps and assigned to Camp Robinson.

DEATHS

Dr. Sterling Price Bond, Little Rock, aged 51, died December 5.

Continued on page 42

ST. LOUIS CLINICS

ANNUAL

CLINICAL CONFERENCE

March 10-13, 1941

Place of Meeting—Coronado Hotel

The St. Louis Clinics will offer an intensive course in various branches of medicine, surgery and surgical specialties. The Conference will be given by members of the medical profession of St. Louis; outstanding medical officers of the Army and Navy, and the following guest clinicians:

FRED L. ADAIR, M.D., Professor of Obstetrics and Gynecology, The University of Chicago School of Medicine, Chicago.

WILLIAM L. BRADFORD, M.D., Associate Professor of Pediatrics, University of Rochester Medical School, Rochester.

CHARLES A. DOAN, M.D., Professor of Medicine, The Ohio State University, Columbus.

WILLIS D. GATCH, M.D., Dean and Professor of Surgery, Indiana University School of Medicine, Indianapolis.

JOHN J. SHEA, M.D., Member, American Laryngological, Rhinological and Otological Society, Memphis.

ARTHUR STEINDLER, M.D., Professor of Orthopedic Surgery, The State University of Iowa, Iowa City.

FRED D. WEIDMAN, M.D., Professor of Dermatologic Research and Vice-Dean for Dermatology-Syphilology, Graduate School of Medicine, University of Pennsylvania, Philadelphia.

Daily Programs from Nine to Five—Three Round Table Luncheon Discussions
Two Evening Programs

The registration fee of ten dollars includes the round table luncheons.

FOR INFORMATION ADDRESS THE ST. LOUIS CLINICS

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Only graduates of medical schools who have completed a year of intern service will be admitted to the course.

The course begins September 22, 1941. Fee for the course is $600.00.

For further information apply to

THE REGISTRAR

WASHINGTON UNIVERSITY SCHOOL OF MEDICINE

St. Louis, Missouri

Continued from page 40

Dr. Robert Nelson Buckmaster, Pangburn, aged 71, died November 17.

Dr. Daniel Warwick Harmon, Hot Springs National Park, aged 60, died November 8 of heart disease.

Dr. O. K. Hukill, Egypt, aged 67, died December 14.

Dr. Archibald M. McKennon, Clarksville, aged 88, died October 23.

DISTRICT OF COLUMBIA

District of Columbia Tuberculosis Association, Washington, has reelected Dr. J. Winthrop Peabody, President, and Dr. L. H. Reichelderfer, Vice-President. Dr. Henry J. Crosson was elected a member of the Board of Directors, and Dr. James A. Murphy and Dr. James G. Cumming were reelected to the Board.

United States Public Health Service has set up a National Advisory Committee on Gerontology to study problems dealing with the aging population.

George Washington University Hospital, Washington, has appointed Dr. Robert E. Coker, Jr., Chapel Hill, North Carolina, and Dr. Eugene Willard, Schenectady, New York, Resident Physicians.

The Children's Hospital, Washington, has reelected Dr. Loren B. T. Johnson and Dr. Joseph S. Wall to the Board of Directors.

Gallinger Municipal Hospital has acquired a new Drinker-Collins respirator, which was purchased with proceeds from the President's Birthday Ball in January, 1940, at a cost of $2,450.

A postgraduate course in ophthalmology will be given at the George Washington University School of Medicine, Washington, April 7-12.

Dr. Harry H. Kerr, Washington, was elected President of the Southern Surgical Association at its recent meeting held in Hot Springs, Virginia.

Dr. Oscar B. Hunter has been elected President of the Washington Kiwanis Club. He expects to expand the program of aid to crippled children during this year.

Dr. Hugh S. Cumming, Director of the Pan-American Sanitary Bureau, Washington, was elected President of the Gorgas Memorial Institute at its annual meeting, November 19.

Dr. Red E. Buxton, formerly of Boston, Massachusetts, is Director of the Washington Institute of Mental Hygiene, succeeding Dr. Paul J. Ewerhardt, resigned.

Dr. James A. Gannon, Washington, has been appointed a member of the District Board of Education.

Dr. George Tolstoi, Washington, an officer in the Army Medical Reserve Corps, has been ordered to Fort Monroe, Virginia.

Dr. Harry Sacks, Washington, and Miss Isabell Boaz, Atlanta, Georgia, were married November 20.

Dr. Thomas Norwood Lide, Washington, and Miss Janet Ormond, Durham, North Carolina, were married October 12.

Deaths

Dr. Taylor Boyd Dixon, Washington, aged 64, died November 2 of coronary thrombosis.

Dr. Edward Browning Meigs, Washington, aged 61, died November 5 of pulmonary tuberculosis.

Dr. Samuel Lumpkin Starks, Washington, aged 60, died October 28.

Dr. James D. Stuart, Washington, aged 75, died October 18.

Dr. James Thurston Wolfe, Washington, aged 59, died December 7.

FLORIDA

The sixty-eighth annual meeting of the Florida Medical Association will be held in Jacksonville, April 28-30.

The Gulf Coast Clinical Society has elected Dr. J. Sam Turberville, Century, President, and Dr. J. C. McSween, Pensacola, Secretary-Treasurer.

Leon-Gadsden-Liberty-Wakulla-Jefferson County Medical Society has elected Dr. S. E. Wilhoit, Quincy, President; Dr. G. H. Garmany, Havana, Vice-President; and Dr. B. A. Wilkinson, Tallahassee, Secretary-Treasurer.

A contract has been let for the construction of six new rooms to the Joseph Halton Hospital at Sarasota. The original structure was completed in 1931 and additions made in 1924 and 1938.

Dr. Charles B. Mabry, Jacksonville, has been doing research work in pathology and orthopedic surgery at the Massachusetts General Hospital, Boston.

Dr. J. H. Mitchell, Jacksonville, has been reelected President of the Baptist Children's Home in that City. This home was

Continued on page 44

The Best Reason To Wait For Spring

THE

NEW ORLEANS GRADUATE MEDICAL ASSEMBLY

Fifth Annual Meeting

MARCH 3-6, 1941

and

Clinic Day in the Hospitals of New Orleans on March 7

GUEST SPEAKERS

Dr. Paul Dudley White, Boston, Cardiology

Dr. Paul A. O'Leary, Rochester, Dermatology

Dr. Richard W. TeLinde, Baltimore, Gynecology

Dr. Ernest E. Irons, Chicago, Medicine

Dr. Maurice C. Pincoffs, Baltimore, Medicine

Dr. Arthur H. Ruggles, Providence, Neuropsychiatry

Dr. Louis E. Phaneuf, Boston, Obstetrics

Dr. Cecil S. O'Brien, Iowa City, Ophthalmology

Dr. Paul C. Colonna, Oklahoma City, Orthopedic Surgery

Dr. W. Wallace Morrison, New York, Otolaryngology

Dr. Lawrence W. Smith, Philadelphia, Pathology

Dr. Charles F. McKhann, Ann Arbor, Pediatrics

Dr. Eugene L. Bishop, Chattanooga, Preventive Medicine

Dr. George E. Binkley, New York, Proctology

Dr. Leo G. Rigler, Minneapolis, Radiology

Dr. Frederick A. Coller, Ann Arbor, Surgery

Dr. Owen H. Wangensteen, Minneapolis, Surgery

Dr. George F. Cahill, New York, Urology

All-inclusive Registration Fee $10.00
(Lectures, Clinics, Daily Roundtable Luncheons, Smoker)

For Information Address
Secretary, Room 105,
1430 Tulane Avenue,
New Orleans, Louisiana

Continued from page 42

organized in 1926 and is a department of the Jacksonville Baptist Association and Northeast Florida Baptist Association.

Dr. Herbert L. Bryans, Pensacola, has been appointed a member of the State Board of Health to fill the unexpired term of the late Dr. N. A. Baltzell, of Marianna.

Dr. Robert A. Mayer has opened offices in Miami Beach, with practice limited to pediatrics.

Dr. John J. Jares, formerly of Lakeland, has opened offices at Sarasota, with practice limited to radiology.

Dr. Carroll T. Bowen, Jacksonville, Director of Venereal Disease Control for the Duval County Health Unit, has been appointed Director of the Broward County Health Unit, with headquarters in Fort Lauderdale.

Dr. Erwin F. Hoffman, formerly of Detroit, Michigan, has been appointed Health Officer of Hendry County, succeeding Dr. Charles W. Pease, who was transferred to Jacksonville.

Dr. Walter L. Shackelford, Superintendent of the Good Samaritan Hospital at West Palm Beach for thirteen years, has resigned to enter private practice.

Dr. Ben Allen Dreibodt, Jacksonville, and Miss Norma Elizabeth Thomas were married October 7.

Dr. Jorge A. Trelles and Miss Conchita Gonzales, both of Tampa, were married in October.

Dr. Eugene L. Jewett, Orlando, and Dr. Ruth S. Hart, Winter Park, were married October 12.

Dr. Robert M. Oliver and Miss Elizabeth Baker Gardner, Miami, were married November 14.

Deaths

Dr. N. A. Baltzell, Marianna, aged 64, died December 8.

Dr. Walter Bryant Guy, St. Augustine, aged 70, died October 3 of coronary thrombosis.

Dr. M. M. Hannum, Eustis, aged 56, died December 9.

Dr. Michael Scott Kearns, Fort Lauderdale, aged 40, died November 14.

Dr. Earle Haggett MacMichael, Englewood, aged 56, died October 27 of hypertensive heart disease.

Dr. E. J. Melville, St. Petersburg, aged 74, died December 8.

Dr. Victor Hugo Miller, Lakeland, aged 53, died October 16 of coronary thrombosis.

Dr. Henry Hurd Rusby, Sarasota, aged 85, died November 18 of intestinal obstruction.

Dr. Willie Gregor Spires, Gaskin, aged 55, died October 19.

Dr. Alexander Douglas Taylor, Daytona Beach, aged 86, died October 5.

GEORGIA

Bibb County Medical Society installed Dr. H. G. Weaver, President; and elected Dr. R. W. Richardson, President-Elect; Dr. Alvin E. Siegel, Vice-President; and Dr. A. M. Phillips, Secretary-Treasurer, all of Macon.

Jackson-Barrow Counties Medical Society has elected Dr. W. L. Mathews, Winder, President; Dr. M. B. Allen, Hoschton, Vice-President; and Dr. J. H. Campbell, Commerce, Secretary-Treasurer.

Dr. Ralph N. Johnson, Rome, has been elected to fellowship in the American College of Surgeons.

Dr. B. C. Teasley, Hartwell, was elected President of the Piedmont Postgraduate Clinical Assembly at its meeting held recently in Anderson, South Carolina.

Dr. W. B. Harrison, Gainesville, has been elected President of the North Georgia Public Health Association.

Dr. Joseph A. Johnson, Greensboro, has resigned as head of the Greene County Health Unit to accept a similar position at Toccoa in charge of the unit including Stephens, Habersham and Rabun Counties.

Dr. Roy L. Johnson, Douglas, has resigned as Health Commissioner in Coffee County to enter private practice.

Dr. Robert V. Schultz, formerly of New York, has been named Director of Public Health Education for the State Department of Health.

Dr. and Mrs. B. C. Powell, Villa Rica, entertained many of their friends and members of the Carroll County Medical Society at their golden wedding anniversary in their home in October.

Dr. Fred F. Rudder will be associated with Dr. Lon C. Grove, Medical Arts Building, Atlanta, in the practice of surgery.

Dr. Wm. L. Dobes announces the opening of his office in the Candler Building, Atlanta, with practice limited to dermatology and syphilology.

Continued on page 46

THE NEW YORK POLYCLINIC

MEDICAL SCHOOL AND HOSPITAL

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For the General Surgeon

A combined surgical course comprising general surgery, traumatic surgery, abdominal surgery, gastroenterology, proctology, gynecological surgery, urological surgery. Attendance at lectures, witnessing operations, examination of patients pre-operatively and post-operatively and follow-up in the wards postoperatively. Pathology, roentgenology, physical therapy. Cadaver demonstrations in surgical anatomy, thoracic surgery, regional anesthesia. Operative surgery and operative gynecology on the cadaver.

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Constipation in infancy probably commands the physician's attention more often than any other symptom that points to the need of readjusting a feeding formula.

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Many physicians use Mellin's Food routinely in preparing bottle feedings, for they know from experience that regular stools of good consistency are characteristic of babies fed on milk properly modified with Mellin's Food. These physicians thus avoid much of the trouble associated with infant feeding.

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MELLIN'S FOOD: Produced by an infusion of Wheat Flour, Wheat Bran and Malted Barley admixed with Potassium Bicarbonate—consisting essentially of Maltose, Dextrins, Proteins and Mineral Salts.

Laxatives

not needed to relieve

Constipation

when the daily feedings are prepared from milk properly modified with

Mellin's Food

Samples sent to physicians upon request.

Continued from page 44

Dr. Clarence L. Ayers, Toccoa, will have associated with him in practice his cousin, Dr. Sanford E. Ayers.

Dr. W. E. Thomasson, Carrollton, has resumed practice after taking postgraduate study at Columbia University College of Physicians and Surgeons, New York City.

Dr. G. K. Cornwell, formerly of Milledgeville, has moved to Eastman and is associated in practice with Dr. J. Cox Wall at the Clinic Hospital.

The University of Georgia has received a sum of $100,000, presented by S. Price Gilbert, to construct an infirmary building. This building will be named in honor of Mr. Gilbert's father, the late Dr. Jasper Newton Gilbert, who was graduated at the Medical College of Georgia, Augusta, and who lived in Columbus.

New Army hospitals are to be built at Savannah and Hinesville under the defense appropriation bill. The 200-bed hospital approved for the airport at Savannah is to provide for the 3,500 officers and men of the air corps stationed there. The 800-bed hospital to be constructed at Hinesville is for the Savannah anti-aircraft area with six regiments, or about 15,000 men. These hospitals are to be replaced later by more substantial structures, as the Army bases in this area will be permanent.

Deaths

Dr. Thomas Z. Clower, Moreland, aged 70, died October 5.

Dr. Raymond Braxton Kicklighter, Glennville, aged 46, died October 29 of tuberculosis.

Dr. Owen F. Moran, Milledgeville, aged 73, died October 31 of myocarditis and arteriosclerosis.

Dr. Wilbur Moate Scott, Milledgeville, aged 49, died October 31.

KENTUCKY

Jefferson County Medical Society, Louisville, held its annual dinner meeting on Monday evening, January 20, at the Pendennis Club, the retiring President, Dr. E. Lee Heflin, presiding. The incoming President, Dr. M. J. Henry, was installed. New officers elected were Dr. Woodford B. Troutman, President-Elect; Dr. R. O. Joplin, First Vice-President; Dr. Gordon S. Buttorff, Second Vice-President; Dr. B. Wilson Smock, Secretary; and Dr. Maurice G. Buckles, Treasurer.

Adair County Medical Society has elected Dr. W. J. Flowers, President; Dr. J. T. Duncan, Vice-President; and Dr. Todd Jefferies, Secretary-Treasurer, all of Columbia.

Mercer County Medical Society has elected Dr. G. E. Lowrey, President; Dr. W. S. Gabhart, Vice-President; and Dr. J. Tom Price, Secretary-Treasurer, all of Harrodsburg.

Dr. E. V. Edwards, formerly of the Mayfield Hospital Staff, is now a resident of Kirkwood, Missouri.

Dr. Lawrence E. Hurt and Miss Louise Conlee, both of Lexington, were married October 28.

Deaths

Dr. Thomas J. Hendrick, Webster, aged 80, died November 6.

Dr. Green L. Johnson, Harrodsburg, aged 56, died December 4.

Dr. Reed Spencer Johnson, Pikeville, aged 58, died November 21 of carcinoma of the throat.

Dr. Porter Prather, Lexington, aged 81, died November 29 from a leg fracture suffered in a fall.

Dr. Carl Lewis Wheeler, Lexington, aged 74, died December 15.

LOUISIANA

Louisiana State Medical Society will hold its next annual meeting at Shreveport, April 21-25.

Bi-Parish Medical Society has elected Dr. W. J. Roberts, Clinton, President; Dr. T. H. Parden, Jackson, Vice-President; and Dr. E. M. Toler, Secretary-Treasurer.

Beauregard Parish Medical Society has elected Dr. J. D. Frazar, President; Dr. T. R. Sartor, Vice-President; and Dr. S. R. Roberts, Secretary-Treasurer, all of DeRidder.

Caddo Parish Medical Society has elected Dr. T. B. Tooke, Belcher, President; Dr. C. R. Gowen, Shreveport, First Vice-President; Dr. Harold J. Quinn, Shreveport, Second Vice-President; Dr. Willis J. Taylor, Shreveport, Secretary; and Dr. W. R. Harwell, Shreveport, Treasurer.

DeSoto Parish Medical Society has elected Dr. W. B. Hewitt, President; Dr. R. P. Thaxton, Vice-President; and Dr. R. A. Tharp, Secretary-Treasurer, all of Mansfield.

East Baton Rouge Parish Medical Society has elected Dr. W. S. Slaughter, President; Dr. B. B. Lane, Jr., Vice-President; and Dr. R. C. Kemp, Secretary-Treasurer, all of Baton Rouge.

Ouachita Parish Medical Society has elected Dr. Henson S. Coon, President; Dr. L. L. Titche, Vice-President; and Dr. J. W. Cummins, Secretary-Treasurer, all of Monroe.

Rapides Parish Medical Society has elected Dr. M. B. Pearce, Alexandria, President; Dr. R. E. McGill, Alexandria, First Vice-President; Dr. Morris Hair, Bunkie, Second Vice-President; and Dr. C. P. Herrington, Alexandria, Secretary-Treasurer.

Red River Parish Medical Society has elected Dr. W. B. Hunter, Coushatta, President; Dr. Jack Carlisle, East Point, Vice-President; and Dr. C. W. Reid, Coushatta, Secretary-Treasurer.

Dr. Leon J. Menville, New Orleans, was elected President of the Radiological Society of North America at its annual meeting held in Cleveland, Ohio, in December.

Dr. Alton Ochsner, New Orleans, was reelected Secretary of the Southern Surgical Association at its recent annual meeting.

Dr. DeWitt T. Milam, Monroe, has been appointed Superintendent of the E. A. Conway Charity Hospital.

Continued on page 48

POST-GRADUATE WEEK
School of Ophthalmology and Otolaryngology
New York Eye and Ear Infirmary
March 24th to March 29th, inclusive

Clinical and practical demonstrations and lectures in various phases of Ophthalmology and Otolaryngology. Otosclerosis Fenestration Operations with presentation of Post-Operative cases.

Guest Speakers: Drs. Walter B. Lancaster, Hanover, N. H.; Louis H. Clerf, Philadelphia, Pa.; Frederick Davis, Madison, Wis.; LeRoy Schall, Boston, Mass.; Elbyrne G. Gill, Roanoke, Va.; Julius Lempert, New York City; Comdr. Julius Neuberger, U.S. Navy; also members of our own staff.

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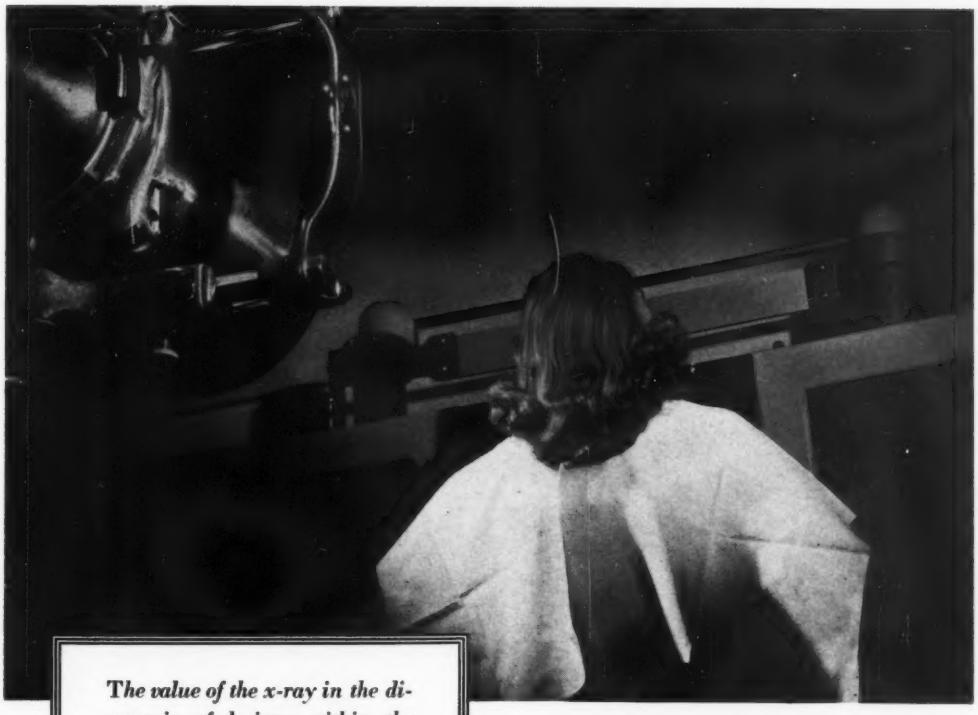

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The diagnostic value of any radiograph is, in the final analysis, dependent upon the specialized knowledge of the one who makes the interpretation. This is the reason why you should refer your patients to a competent radiologist.

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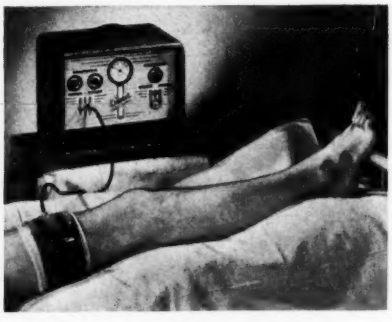
A NEW DEGREE OF RELIEF

In the treatment of occlusive vascular disturbances of the extremities, the value of intermittent venous constriction is firmly established in the literature.

Now, with the development of selective timing as presented in the new Burdick RC-2 Rhythmic Constrictor, treatments may be individualized to meet the requirements of each case, and better results may often be expected.



The New Burdick RC-2 DUAL TIMING Rhythmic Constrictor

is simple to operate—silent—reasonably priced. The periods of constriction and release are timed separately with the Dual Timer so that any desired technic of timing may be employed.

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Continued from page 46

Dr. William C. Summer, Minden, Director of the Webster Parish Health Unit for ten years, recently resigned to become Consultant Adviser to the parish health units in eighteen parishes of northern Louisiana. He succeeds Dr. Edmond G. Klamke, New Roads, Health Director of Pointe Coupee Parish.

Dr. John M. Whitney, Jennings, formerly head of the Jefferson Davis Parish Health Unit, is now Director of fifteen parish health units in southwestern Louisiana.

DEATHS

Dr. Montrose Day, Haynesville, aged 85, died October 27 of coronary thrombosis.

Dr. Walter A. Jenkins, Church Point, aged 80, died October 15 of diabetes mellitus, nephritis and myocarditis.

Dr. George L. Shoemaker, Jennings, aged 80, died October 21 of coronary thrombosis.

MARYLAND

Dr. Alfred Blalock, formerly Professor of Surgery at Vanderbilt University School of Medicine and Visiting Surgeon at Vanderbilt Hospital, Nashville, Tennessee, has been appointed Professor of Surgery at Johns Hopkins University School of Medicine and Surgeon-in-Chief to the Johns Hopkins Hospital, Baltimore, succeeding Dr. Dean Lewis, who retired in the spring of 1939.

DEATHS

Dr. Joseph O. King, Ridge, aged 67, died October 31 of pulmonary tuberculosis.

Dr. Irving Isaac Littman, Baltimore, aged 37, died November 2 of cerebral embolism.

Dr. John Willis Martin, Annapolis, aged 44, died November 5 of a brain tumor.

Dr. Alexander Eustace Muse, Baltimore, aged 76, died November 18 of carcinoma of the prostate.

Dr. John Charles Norton, Baltimore, aged 53, died November 10 of coronary thrombosis.

Dr. William James Pillsbury, Baltimore, aged 72, died October 29 of cerebral hemorrhage.

MISSISSIPPI

Adams County Medical Society has elected Dr. J. S. Ullman, Natchez, President, and Dr. L. S. Gaudet, Natchez, Secretary-Treasurer.

Amite-Wilkinson Counties Medical Society has elected: For Amite, Dr. W. R. Brumfield, Gloster, President: Dr. D. H. Thornhill, Crosby, Vice-President; and Dr. Anderson Butler, Liberty, Secretary. For Wilkinson, Dr. C. E. Catchings, Woodville, President; Dr. S. E. Field, Centreville, Vice-President; and Dr. R. J. Field, Centreville, Secretary.

Coast Counties Medical Society has elected Dr. C. H. McCall, Gulfport, President; Vice-Presidents: Harrison, Dr. R. W. Burnett, Biloxi; Jackson, Dr. R. C. Eley, Moss Point; Hancock, Dr. A. P. Smith, St. Louis; Stone, Dr. S. E. Dunlap, Wiggins; and Dr. D. L. Hollis, Biloxi, Secretary-Treasurer.

East Mississippi Medical Society has elected Dr. C. A. Kirk, Louisville, President; and Dr. N. C. Knight, Meridian, Secretary-Treasurer.

Newton County Medical Society has elected Dr. Z. C. Hagan, Union, President; Dr. W. J. Pennington, Decatur, Vice-President; and Dr. Dudley Stennis, Newton, Secretary-Treasurer.

Neoshoba County Medical Society has elected Dr. C. H. Harrison, Philadelphia, President, and Dr. R. G. Hand, Philadelphia, Secretary.

Continued on page 50

Chicago Eye, Ear, Nose & Throat College
Established 1897
231 W. Washington St., Chicago, Ill.

Practical postgraduate course in Ophthalmology and Otolaryngology.

Doctors admitted at any time for review and clinical observation.

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The calcium salt, while similar in action to the ammonium salt, is more pleasant to take, being more nearly tasteless. Both forms are supplied in *tablet* form exclusively and are far more agreeable and pleasant to take than liquid preparations.

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Tablets Ammonium Mandelate
uncoated
7½ grains, in bottles of 200 and 1000
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Tablets Ammonium Mandelate
enteric-coated
5 grains, in bottles of 200 and 1000

Tablets Calcium Mandelate
uncoated
7½ grains, in bottles of 200 and 1000

To facilitate the control of urinary acidity, Nitrazine Test Paper and color chart are supplied with all bottles. With Nitrazine*—a sensitive indicator—one may accurately determine the acidity or alkalinity of the urine.

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MANUFACTURING CHEMISTS TO THE MEDICAL PROFESSION SINCE 1858

Continued from page 48

Pontotoc County Medical Society has elected Dr. W. H. Reid, Toccopola, President; Dr. R. D. Donaldson, Pontotoc, Vice-President; and Dr. E. B. Burns, Ecru, Secretary.

Thirteen Counties Medical Society has elected Dr. H. L. Scales, Jr., Starkville, President; and Dr. A. J. Stacy, Tupelo, Secretary, reelected.

The new hospital at Louisville was formally opened on December 30.

Dr. E. M. Nixon, Director of Mississippi County Health Unit, has resigned to enter private practice in Little Rock, Arkansas. He will be associated with Dr. Joe T. Shuffield, an orthopedic surgeon.

Dr. D. W. Hamrick, Corinth, has been appointed as the authorized physical examiner for the CAA, the appointment having come from the CAA Medical Director at Washington, D. C.

Dr. M. M. Sims, of the Lafayette County Health Unit, has resigned to enter military service for one year. Dr. T. L. Owings, McComb, will succeed Dr. Sims.

Dr. R. N. Whitfield, Director of the Vital Statistics Division of the State Board of Health, Jackson, was chosen President-Elect of the Mississippi Public Health Association at its meeting held in Jackson in December.

Dr. G. O. Garner, head of the Noxubee County Health Department, Macon, has resigned to accept a position with the Marine Division of the Standard Oil Company of New Jersey, with offices in New York.

Dr. James M. Campbell, Morton, has been appointed Health Officer of Marion County.

Dr. Arthur P. Vandergrift, Jr., formerly of Jackson, has been named Director of the DeSoto County Health Unit, succeeding Dr. John W. Evans, Jr., Hernando. Dr. Evans is taking postgraduate work at the Washington University School of Medicine, St. Louis, Missouri.

Dr. I. W. Barrett and Miss Irma Lee Barnes, both of Clarksdale, were married December 24.

Deaths

Dr. W. R. Best, Greenwood, aged 80, died December 12.

Dr. John Harbour McBee, Greenwood, aged 58, died December 14 following a heart attack.

Dr. E. L. Walker, Magee, aged 67, died December 18.

MISSOURI

The eighty-fourth annual meeting of the Missouri State Medical Association will be held in St. Louis, April 28-30, at the Jefferson Hotel.

Dr. Neil S. Moore, St. Louis, has been appointed General Chairman for the St. Louis meeting of the Southern Medical Association, November 11-14, the appointment having been announced recently by Dr. Joseph C. Peden, President of the St. Louis Medical Society, the host Society.

St. Louis Medical Society has elected Dr. Joseph C. Peden, President; Dr. William G. Becke, First Vice-President; Dr. Grace S. Montjoy, Second Vice-President; and Dr. Victor E. Scherman, Secretary, the new officers being installed at the annual meeting on January 7. Dr. Herbert S. Langsdorf is the retiring President.

St. Louis County Medical Society has elected Dr. Eugene R. Brown, St. Louis, President; Dr. F. L. Finley, Overland, Vice-President; Dr. William Harold Bailey, St. Louis, Secretary; and Dr. W. F. O'Malley, Webster Groves, Treasurer. The new officers were installed at the annual meeting January 8. Dr. Julius Jensen is the retiring President.

Boone County Medical Society has elected Dr. William B. Brown, President; Dr. M. E. Cooper, Vice-President; and Dr. O. F. Bradford, Secretary-Treasurer, all of Columbia.

Cape Girardeau County Medical Society has elected Dr. C. A. W. Zimmermann, President; Dr. O. L. Seabaugh, Vice-President; Dr. M. H. Shelby, Secretary; and Dr. C. T. Herbert, Treasurer, all of Cape Girardeau.

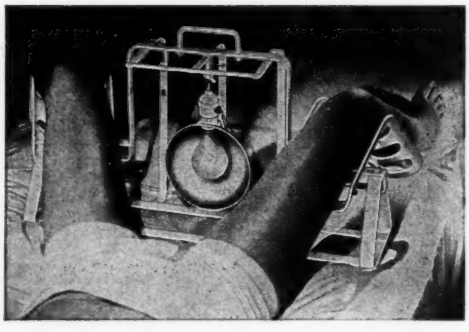
Chariton County Medical Society has elected Dr. G. W. Hawkins, Salisbury, President; Dr. W. T. Hyatt, Brunswick, Vice-President; and Dr. F. L. Harms, Salisbury, Secretary-Treasurer.

Howard County Medical Society has elected Dr. W. B. Kitchen, Glasgow, President; Dr. W. M. Dickerson, Armstrong, Vice-President; and Dr. Wm. J. Shaw, Fayette, Secretary-Treasurer.

Nodaway-Atchison-Gentry-Worth Counties Medical Society has elected Dr. Samuel E. Simpson, Stanbury, President; Dr. Pren J. Ross, Grant City, Vice-President; and Dr. Charles D. Humberd, Barnard, Secretary-Treasurer.

Platte County Medical Society has elected Dr. Henry M. Clark, Platte City, President; Dr. Silas L. Durham, Dearborn,

Continued on page 52



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SO many makeshifts have been used in perineal heating, without securing proper results, that the Ringo-Westrup Heater has been widely welcomed. Its perfect placement of variable heat to the perineum for relief of pain gives it a place in hospital and office alike. In compact, inexpensive form, it provides easy placement of heat in variable degree, with comfort for the patient and correct application of the thermal benefit. General use is found for the device in post-partum lacerations, after perineorrhaphy, episiotomy, etc. Weighs only ten pounds; has frame holding bed covers off lamp, preventing scorching. Variable heat switch operates by two pull chains. Knee crutches adjust to 3 positions.

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ORETON-M*, 10 mg. to the tablet, available in 15, 30, and 100 tablets to the box.

*Trade Mark Reg. U. S. Pat. Off.

Continued from page 50

Vice-President; and Dr. George Spence Redman, Platte City, Secretary-Treasurer.

Lewis-Clark-Scotland County Medical Society has elected Dr. J. R. Bridges, Kahoka, President, and Dr. P. W. Jennings, Canton, Secretary.

Dr. Richard S. Weiss, St. Louis, was elected President of the American Academy of Dermatology and Syphilology at its annual session in Chicago in December.

Dr. Lawrence T. Post, St. Louis, who recently retired as Editor of the *American Journal of Ophthalmology*, was guest of honor at a dinner given by the St. Louis Ophthalmic Society November 27.

Dr. Charles S. Sample, Jr., Passed Assistant Surgeon, U. S. Public Health Service, has been relieved at Springfield and assigned as Chief Medical Officer at the Federal Reformatory at El Reno, Oklahoma.

Deaths

Dr. Herbert S. Langsdorf, St. Louis, aged 48, died January 16 of a heart attack.

Dr. David B. Stutsman, St. Louis, aged 45, died January 6 of a heart attack.

Dr. Frank Leonidas Hall, Hannibal, aged 79, died November 11.

Dr. John Walter Herritage, Jr., St. Louis, aged 28, died October 6 of pulmonary tuberculosis.

Dr. William Tecumseh Pittman, Spickard, aged 70, died October 31.

Dr. John Powers, Kansas City, aged 81, died November 7 of arteriosclerotic nephritis with uremia.

NORTH CAROLINA

Forsyth County Medical Society has elected Dr. C. A. Street, President; Dr. Fred K. Garvey, First Vice-President; Dr. Fielding Combs, Second Vice-President; Dr. P. A. Yoder, Secretary; and Dr. Howard M. Starling, Treasurer, all of Winston-Salem.

Guilford County Medical Society has elected Dr. Fred Patterson, President, and Dr. H. C. Warwick, Secretary, both of Greensboro.

Halifax County Medical Society has elected Dr. M. C. Maddrey, Roanoke Rapids, President; Dr. O. F. Smith, Scotland Neck, Vice-President; and Dr. Robert F. Young, Halifax, Secretary-Treasurer.

Pinehurst has been chosen for the 1941 meeting place of the Southern Surgical Association.

Duke University School of Medicine and Duke Hospital, Durham, observed its tenth anniversary in November. An addition to the hospital and a new department of psychiatry were dedicated. The new psychiatric wards, providing eighteen beds, and named in honor of Dr. Adolph Meyer, Henry Phipps Professor of Psychiatry of the Johns Hopkins University School of Medicine, Baltimore, Maryland, were opened with a clinic conducted by Dr. Meyer. Dr. Richard S. Lyman, formerly of Baltimore, was appointed Professor of Psychiatry.

Duke University School of Medicine Alumni Association, Durham, was organized November 29 with the following officers: Dr. J. M. Arena, President; Dr. R. W. Graves, Vice-President; Dr. J. L. Callaway, Secretary-Treasurer; and Dr. L. D. Baker, Corresponding Secretary.

Dr. Herbert Fox, Dr. I. H. Manning, Jr., and Dr. Frances Hill Fox have been appointed Instructors in Medicine to assist with the teaching in Physical Diagnosis at the Watts Hospital, Durham.

North Carolina Pathological Society has elected Dr. James B. Bullitt, Chapel Hill, President, and Dr. Coy C. Carpenter, Wake Forest, Secretary, reelected.

The completion of the new $320,000 State Laboratory of Hygiene, including the downtown building and the farm near Raleigh, is one of the outstanding public health accomplishments during 1940.

Dr. Preston White, Charlotte, has been elected a member of the American Clinical and Climatological Association.

Dr. H. H. Briggs, Jr., Asheville, has been certified by the American Board of Ophthalmology.

Continued on page 54

LaMOTTE BLOOD CHEMISTRY SERVICE

New LaMotte Outfit for the Determination of Sulfathiazole, Sulfanilamide and Sulfapyridine in Blood and Urine

Latest improved procedure employs N (1-Naphthyl) ethylenediamine dihydrochloride and Ammonium Sulfamate in the coupling reaction. Determines free and combined form in blood and urine. This simple procedure enables one to determine one or all three of these drugs in a minimum amount of time. Outfit is complete with instructions. Price $23.50, F. O. B. Towson, Baltimore, Md.

This Service includes a series of similar outfits for conducting the following accurate tests: Blood Sugar, Blood Urea, Icterus Index, Phenolsulphonphthalein, Urine pH, Blood pH, Gastric Acidity, Calcium-Phosphorus, Blood Bromides, Blood Proteins, Urinalysis.

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For relief of colic or spasm

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Inhibits peristalsis
An effective anti-spasmodic

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Continued from page 52

Dr. Edward Stewart Orgain and Miss Ann Lewis, both of Durham, were married December 28.

Dr. J. Samuel Blair, Gastonia, and Miss Mary Gwynne Fewell were married in October.

Dr. David Brainard Gregg, Greensboro, and Miss Mary Page Newton, Charleston, South Carolina, were married October 17.

Dr. Thomas Brice Mitchell and Miss Sara Elizabeth Tyson, both of Shelby, were married November 3.

Dr. Charles S. Norburn, Asheville, and Miss Helen Sophia Johnson were married in November.

Deaths

Dr. C. O. Delaney, Winston-Salem, aged 46, died December 15.

Dr. George Oates, Grover, aged 68, died November 2 of cerebral hemorrhage.

Dr. Walter Wesley Sawyer, Elizabeth City, aged 60, died October 20 of coronary thrombosis.

OKLAHOMA

Oklahoma State Hospital Association has elected Dr. L. E. Emanuel, Chickasha, President; Dr. E. U. Benson, Cushing, Vice-President; and Dr. J. O. Bush, Jr., Secretary-Treasurer.

Deaths

Dr. Walter L. Rose, Woodward, aged 64, died November 13.

Dr. Zachary Joseph Clark, Cherokee, aged 73, died November 14.

SOUTH CAROLINA

At a meeting of the Council of the South Carolina Medical Association held early in December Dr. Julian P. Price, Florence, was elected Secretary and Treasurer to succeed Dr. Edgar A. Hines, deceased. Dr. Joseph I. Waring, Charleston, was elected Editor of the *Journal;* Dr. William L. Pressly, Due West, State Chairman for Medical Preparedness; and Dr. Thomas A. Pitts, Columbia, member of the House of Delegates of the American Medical Association.

Anderson County Medical Society has elected Dr. Ned Camp, Anderson, President; Dr. C. C. Horton, Pendleton, Vice-President; and Dr. S. H. Haddock, Anderson, Secretary-Treasurer.

Dr. K. L. Able has been elected Mayor of Leesville.

Construction of a new 1,000-bed Army general hospital, to be located in the vicinity of Charleston, is planned at a cost of the buildings and grounds of $3,000,000.

TENNESSEE

Anderson County Medical Society has elected Dr. A. W. Bishop, Morris, President; Dr. George D. Schuessler, Oliver Springs, Vice-President; and Dr. J. S. Hall, Clinton, Secretary-Treasurer.

Dyer-Lake-Crockett Counties Medical Society has elected Dr. E. B. Smythe, Tiptonville, President; Dyer, Dr. J. W. Wynne, Newbern, Vice-President; Lake, Dr. W. S. Alexander, Ridgely, Vice-President; Crockett, Dr. W. H. Stallings, Friendship, Vice-President; and Dr. C. L. Denton, Dyersburg, Secretary-Treasurer.

Hardin-Lawrence-Lewis-Perry-Wayne Counties Medical Society has elected Dr. C. C. Stockard, Lawrenceburg, President; Hardin, Dr. O. C. Doty, Savannah, Vice-President; Lawrence, Dr. Leo Harris, Lawrenceburg, Vice-President; Lewis, Dr. W. E. Boyce, Flatwoods, Vice-President; Perry, Dr. O. A. Kirk, Linden, Vice-President; Wayne, Dr. Frank Norman, Waynesboro, Vice-President; and Dr. O. H. Williams, Savannah, Secretary-Treasurer.

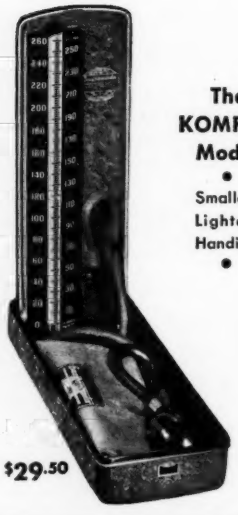
Greene County Medical Society has elected Dr. John Kite, Bulls Gap, President; Dr. M. A. Blanton, Mosheim, Vice-President; and Dr. Rae B. Gibson, Greenville, Secretary.

Polk County Medical Society has elected Dr. W. Y. Gilliam, Copperhill, President; Dr. H. P. Hyde, Copperhill, Vice-President; and Dr. F. O. Geisler, Isabella, Secretary-Treasurer.

Sullivan-Johnson Counties Medical Society has elected Dr. William Gammon Bristol, President; Sullivan, Dr. W. A. Wiley, Kingsport, Vice-President; Johnson, Dr. Robert O. Glenn, Moun-

Continued on page 56

No Compromise with *Principle*



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No bloodpressure instrument could possibly have achieved and maintained the world-wide acceptance of the Baumanometer unless its worth was easily recognizable.

We'd like you to have a true conception of its accuracy, simplicity, convenience, and the complete economical bloodpressure service it can render. Therefore, we have authorized your surgical supply dealer to send you on request, a Baumanometer, for inspection and trial—at no expense to you. We urge you to take advantage of this offer!

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PATTERSON X-RAY SCREEN RESEARCH

THE FOUNDING of The Patterson Screen Company 28 years ago was due to the successful culmination of a research project. The long quest for a satisfactory fluoroscopic screen chemical resulted in the Standard Fluoroscopic Screen, and the inception of a business.

It is quite logical, then, that because research is the very corner stone, it should continue to be a most significant part of all Patterson activities. With the growth of the science of radiography, Patterson has carried on a constantly broadening program of research and development, in the world's largest laboratory entirely devoted to this field.

As a result of this research effort Patterson has made available to the profession many notable achievements, including:—the first stable fluoroscopic screen without lag, the first grainless intensifying screen, the first cleanable intensifying screen, and others.

Equally important to the X-ray field has been the dependable uniformity of Patterson screens and their conformity to those self imposed high standards which have made them outstanding the world over. The company's extensive laboratory facilities and highly trained personnel make possible the detailed analysis of every chemical ingredient before it is accepted for production. During manufacture, too, laboratory control is never relaxed, so that the finished screen is as nearly perfect as modern scientific methods permit.

The great significance attributed to research in the production of fine screens will be indicated in succeeding Patterson advertisements.

THE PATTERSON SCREEN COMPANY
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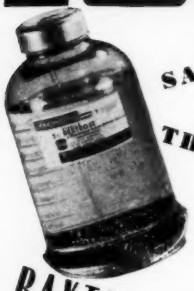
21 TESTS



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CHICAGO NEW YORK

Continued from page 54

tain City, Vice-President; and Dr. D. D. Vance, Bristol, Secretary-Treasurer.

Robertson County Medical Society has elected Dr. C. M. Banks, Springfield, President; Dr. Robert H. Elder, Cedar Hill, Vice-President; and Dr. John S. Freeman, Springfield, Secretary-Treasurer.

Washington County Medical Society has elected Dr. W. D. Hankins, Johnson City, President; Dr. J. R. Bowman, Johnson City, Vice-President; and Dr. H. B. Cupp, Mountain Home, Secretary-Treasurer.

Tennessee Public Health Association, at its annual conference in Nashville in October, installed Dr. John J. Lentz, Nashville, President, elected Dr. Lloyd M. Graves, Memphis, President-Elect, and reelected Dr. Robert H. Hutcheson, Nashville, Secretary.

Tennessee Tuberculosis Association, at its annual meeting, reelected Dr. Horton R. Casparis, Nashville, President, and Dr. Stanford M. Herron, Jackson, Secretary.

Dr. Edward Clay Mitchell, Memphis, was elected President-Elect of the American Academy of Pediatrics at its meeting held in Memphis in November.

Dr. Alfred Blalock, Professor of Surgery, Vanderbilt University School of Medicine and Visiting Surgeon at Vanderbilt Hospital, Nashville, has been appointed Professor of Surgery at Johns Hopkins University School of Medicine and Surgeon-in-Chief to the Johns Hopkins Hospital, Baltimore, Maryland, succeeding Dr. Dean Lewis, who resigned in the spring of 1939.

Dr. Ralph O. Rychener, Memphis, was elected Vice-President of the American Academy of Ophthalmology and Otolaryngology at its recent meeting.

Dr. Henry E. Meleney, Associate Professor of Preventive Medicine and Public Health at Vanderbilt University School of Medicine, Nashville, has been appointed Hermann M. Briggs Professor of Preventive Medicine at New York University College of Medicine, effective April 1.

Dr. Henry E. Meleney, Nashville, was recently made a member of the Subcommittee on Tropical Diseases of the National Research Council cooperating with the Medical Departments of the Army and Navy in the National Defense Program.

Dr. Wilson T. Sowder, Passed Assistant Surgeon, U. S. Public Health Service, has been relieved at Morristown and ordered to Pensacola, Florida, to establish headquarters.

Dr. Sanford E. Gaines, Sparta, who has completed fifty years in the practice of medicine, was honored recently when Dr. Charles B. Roberts, Sparta, entertained the White County Medical Society at a dinner. Dr. Charles E. Reeves, Gainesboro, the guest speaker, paid tribute to Dr. Gaines.

Dr. William B. Faris, Tazewell, has been appointed Health Officer of Williamson County to succeed Dr. Roscoe Faulkner, who is now located at Batesville, Mississippi.

Dr. Warren C. Ramer, Trenton, has been appointed head of the Henderson-Decatur County Health Unit to succeed Dr. James C. Armstrong, now of Jefferson City, resigned.

Dr. Tinsley R. Harrison, Nashville, recently received the honorary degree of master of science from the University of Michigan Medical School, Ann Arbor.

Dr. John B. Youmans, Associate Professor of Medicine, Vanderbilt University School of Medicine, Nashville, has been granted a leave of absence to serve as a member of the Health Commission of the Rockefeller Foundation in Europe during the coming year.

Deaths

Dr. Nat Taylor Dulaney, Jr., Bristol, aged 70, died November 15.

Dr. James P. Womack, Nashville, aged 79, died October 28 of cerebral hemorrhage.

Continued on page 58

Classified Advertisements

RATES for insertion in the Classified Column are as follows: $2.00 minimum, which includes the first 50 words; for each word in addition to the original 50 words, the charge is 3c.

WANTED—Experienced man as assistant resident; large traumatic and fracture service; American, Class A school; personal interview; salary commensurate with position; state race, religion and nationality. Address inquiries to Dept. D-12, care Southern Medical Journal, Birmingham, Alabama.

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Restrains the growth of the causative organism

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Serenium* is an orally administered azo dye of high purity and uniformity. It has a low toxicity index and a wide margin of safety and may be used over a considerable period of time without producing undesirable systemic by-effects. It may therefore be employed advantageously between courses of mandelic acid or sulfathiazole.

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Serenium is effective in acid or in alkaline urine from pH 4.6 to 5.6 on the acid side and from pH 7.0 to 7.6 on the alkaline side. Mandelic acid is effective only in acid urine while sulfonamide preparations require an alkaline urine. Serenium can be used in either acid or alkaline urine as an alternate form of therapy. The usual dose is one 0.1-gram tablet t.i.d. before meals.

Free Sample on Request

Many physicians have tried Serenium and found it effective. We believe that a trial will convince you of its merits and you will prescribe it often. To get a generous sample simply send us the coupon below with your professional card or letterhead. Mail the coupon—NOW!

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NEW YORK

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Street .....

City..... *State*.....

Continued from page 56

TEXAS

Dr. Samuel M. Hill, Dallas, has donated a library wing to St. Paul's Hospital, Dallas. It has a capacity of about 3,000 books.

Dr. Lucius R. Wilson, Superintendent of the John Sealy Hospital, Galveston, since 1928, resigned to become Superintendent of the Hospital of the Protestant Episcopal Church of Philadelphia, Pennsylvania, effective January 1.

Dr. Grace Humphreys Hood, Fort Worth, and Mr. Derwood Morton, Dallas, were married September 12.

DEATHS

Dr. Timothy Deason, Brachfield, aged 84, died November 5 of heart disease and hypertrophic arthritis.

Dr. Walter A. Gatlin, Paris, aged 67, died October 25 of coronary occlusion.

Dr. Thomas Wayne Hancock, Lufkin, aged 59, was killed November 4 in an automobile accident.

Dr. Andrew J. Hays, Weslaco, aged 79, died October 15 of myocarditis.

Dr. John T. Iles, Ewing, aged 63, died October 16 of cardiovascular renal disease.

Dr. Henry Andrew Lile, Harlingen, aged 66, died October 21.

Dr. Samuel Jackson Pate, Woodville, aged 62, died October 17 of chronic nephritis, myocarditis and hypertension.

Dr. William Leonard Simmons, Eastland, aged 70, died November 2 of cerebral hemorrhage.

Dr. Joe Newton Whittle, Gladewater, aged 75, died October 25 of diabetes and cerebral hemorrhage.

VIRGINIA

At the forty-fifth annual meeting of the Seaboard Medical Association of Virginia and North Carolina, held recently, Dr. Waverly R. Payne, Newport News, was elected President; Dr. G. Erik Bell, Wilson, North Carolina; Dr. Wilbert E. Butler, Norfolk; Dr. W. A. Nicholson, Washington, North Carolina; and Dr. L. L. Sawyer, Great Bridge, Vice-Presidents; and Dr. Clarence Porter Jones, Newport News, Secretary, reelected.

Fredericksburg County Medical Society has elected Dr. L. F. Lee, Passapatanzy, President; Dr. T. B. Payne, Fredericksburg, Vice-President; and Dr. L. A. Busch, Fredericksburg, Secretary-Treasurer.

Hanover County Medical Society has elected Dr. A. C. Ray, Jr., Ashland, President; Dr. J. A. Wright, Jr., Doswell, Vice-President; and Dr. Chas. L. Savage, Ashland, Secretary-Treasurer.

Lynchburg Academy of Medicine installed Dr. Powell G. Dillard, Lynchburg, President, and elected Dr. John Hundley, Lynchburg, President-Elect, and Dr. Carleton Moorman, Altavista, Vice-President.

Medical Society of Northern Virginia has elected Dr. John B. McKee, Winchester, President; Dr. D. M. Kipps, Front Royal, Vice-President; and Dr. J. E. Harris, Winchester, Secretary-Treasurer, reelected.

Petersburg Medical Society has elected Dr. L. S. Early, President; Dr. J. Bolling Jones and Dr. Philip Jacobson, Vice-Presidents; and Dr. Wilbur Bowman, Secretary-Treasurer.

Richmond Academy of Medicine has installed Dr. William Branch Porter, President, and elected Dr. Beverley R. Tucker, President-Elect; Dr. T. Dewey Davis and Dr. O. B. Darden, Vice-Presidents.

Dr. Porter P. Vinson, Richmond, has been elected President of the Alumni Association of the Mayo Foundation.

Dr. Milton Salasky, formerly a resident at the Brooklyn Eye and Ear Hospital, has opened offices in the Wainwright Building, Norfolk, practice limited to ophthalmology and otorhinolaryngology.

Dr. Lee Scott Barksdale resigned his position as Director of the Hopewell Health Department and has opened offices in the State Planters Bank Building at Hopewell, doing private practice.

Dr. W. A. Browne has resigned his position as City Epidemiologist at Richmond and is now located in Alexandria as City Health Officer.

At the recent meeting of the Southern Surgical Association, held at Hot Springs, Dr. A. P. Jones, Roanoke, was named a Vice-President, and Dr. Guy Horsley, Richmond, was admitted to membership.

Dr. Walter Bronley Foster, who has been head of the Richmond

Continued on page 60

EFFECTIVE THERAPY
IN
Otitis Media
REQUIRES ANALGESIA - BACTERIOSTASIS, AND DEHYDRATION OF THE TISSUES.
Auralgan
THE DOHO CHEMICAL CORPORATION, New York - Montreal - London

VEGEX AND VEGEX-VITAFOOD DRIED BREWERS YEAST FOR THE COMPLETE VITAMIN B COMPLEX

"The simplest definition of the vitamin B complex is that it is an assemblage of the water-soluble vitamin factors present in yeast." (The Lancet, November 2, 1940, page 558.)

Vegex, the autolyzed extract of grain grown brewers' yeast, has long been the standard for the complete vitamin B complex in important medical centers throughout the world as well as in private practice.

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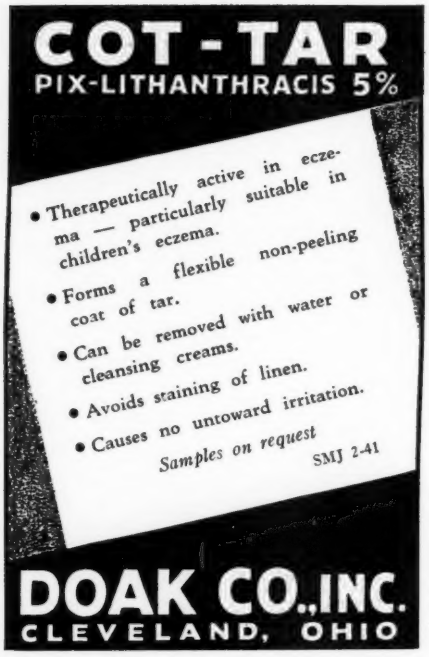
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Continued from page 58

Department of Public Welfare for sixteen years, has been appointed to the staff of the State Department of Health.

A new health district consisting of Isle of Wight, Nansemond, Norfolk and Princess Anne Counties, has been formed, Dr. John C. Neale, Jr., Abingdon, being in charge with headquarters at Norfolk.

Dr. Harold M. Kelso succeeds Dr. John C. Neale, Jr., as Director of the Southwest District with headquarters at Abingdon. Dr. Allen W. Lane, Lawrenceville, succeeds Dr. Kelso as Health Officer of Pulaski County.

Dr. Thomas F. McGough, Jr., formerly Assistant Health Officer of Pulaski County, Pulaski, has been transferred to Northampton County with headquarters in Eastville, replacing Dr. William Y. Garrett. Dr. Garrett is taking a course at the Johns Hopkins School of Hygiene and Public Health, Baltimore, Maryland.

Dr. William Province McGuire, Winchester, and Miss Dorothy Elizabeth Robinson, of Paterson, New Jersey, were married in October.

Dr. James Benjamin Shuler, Shenandoah, and Miss Mary Catherine McCarthy, Butte, Montana, were married in Waikiki, Hawaii, August 31.

Dr. John Edward Hamner, Petersburg, and Miss Augusta Louise Johnson, Richmond, were married December 14.

Dr. Joseph Ney, Harrisonburg, and Miss Carol Smith Straus, Richmond, were married December 5.

Dr. Thomas Duval Watts, Richmond, and Miss Ruby Alice Lake, Jackson, Tennessee, were married November 30.

Dr. Samuel Milchin, Bishop, and Miss Virginia Macon, Pocahontas, were married November 22.

Dr. Robert Richardson Eason, Buena Vista, and Miss Mabel Nash, Blackstone, were married December 21.

Deaths

Dr. Karl S. Blackwell, Richmond, aged 62, died December 26.

Dr. Emory Hill, Richmond, aged 58, died December 4.

Dr. Samuel Hutchings Price, Montvale, aged 88, died December 13.

Dr. William Oliver Smith, Altavista, aged 71, died December 17.

Dr. Robert Baylor Shackelford, Cismont, aged 59, died in November.

Dr. Marmaduke Atkinson, Amelia Court House, aged 61, died December 2.

WEST VIRGINIA

Eastern Panhandle Medical Society has elected Dr. G. O. Martin, President; Dr. W. L. Haltom and Dr. A. B. Eagle, Vice-Presidents; and Dr. Max Oates, Secretary-Treasurer, all of Martinsburg.

Fayette County Medical Society has elected Dr. M. A. Moore, Longacre, President; Dr. C. H. Engelfried, Montgomery, Vice-President; Dr. W. B. Davis, Elkridge, Vice-President; and Dr. Gilbert A. Daniel, Alloy, Secretary-Treasurer.

Kanawha County Medical Society has elected Dr. P. A. Tuckwiller, President; Dr. Owen McMillan, Vice-President; and Dr. W. A. Thornhill, Jr., Secretary-Treasurer, reelected, all of Charleston.

Logan County Medical Society has elected Dr. C. A. Davis, President; Dr. J. W. Carney, Vice-President; and Dr. W. P. Hamilton, Secretary-Treasurer, all of Logan.

Monongalia County Medical Society has elected Dr. William B. Scherr, President; Dr. Carl E. Johnson, Vice-President; Dr. C. T. Thompson, Secretary; and Dr. Thos. Judson McBee, Treasurer, all of Morgantown.

Potomac Valley Medical Society has elected Dr. J. A. Newcome, Keyser, President; Dr. J. B. Groves, Petersburg, Dr. R. W. Dailey, Romey, Dr. O. V. Brooks, Moorefield, Dr. O. F. Mitchell, Franklin, and Dr. J. H. Wolverton, Jr., Piedmont, Vice-Presidents; and Dr. E. A. Courrier, Keyser, Secretary.

Eastern Panhandle Medical Association has elected Dr. J. M. Miller, Charles Town, President, and Dr. A. B. Eagle, Martinsburg, Secretary-Treasurer.

Dr. Ray M. Bobbitt, Assistant to Dr. L. V. Guthrie, Superintendent at the Huntington State Hospital, has resigned in order to take a special course in genito-urinary diseases and diseases of the skin in Baltimore, Maryland.

Dr. Roy B. Miller, formerly of Hinton, has located in Parkersburg, with practice limited to surgery.

The following physicians have been called to active military duty at Fort Benning, Georgia: Capt. J. L. Waldock, Nellis; Lt. G. L. Armbrecht, Wheeling; Lt. D. L. Butterfield, Milburn; Lt. A. B. Kizinski, Logan; Lt. L. H. Layman, Holden; Lt. E. R. McNinch, Weirton; Lt. K. M. McPherson, Beckley; Lt. B. J. Moore, Chester; Lt. J. H. Thornbury, Logan; and Lt. James O. Warren, Welch.

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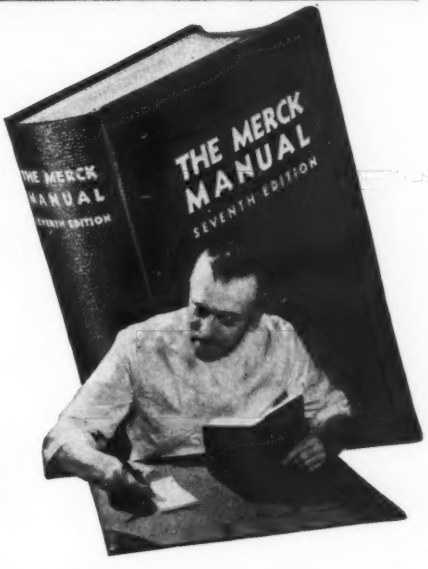

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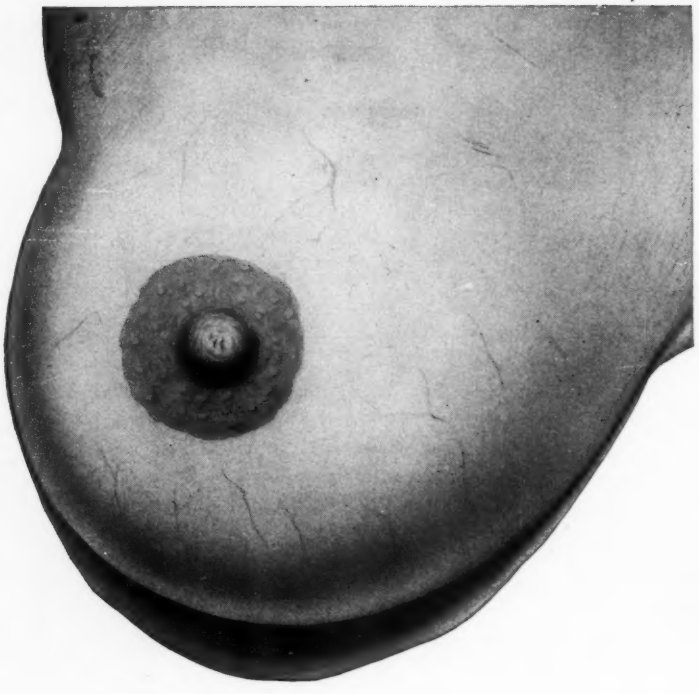

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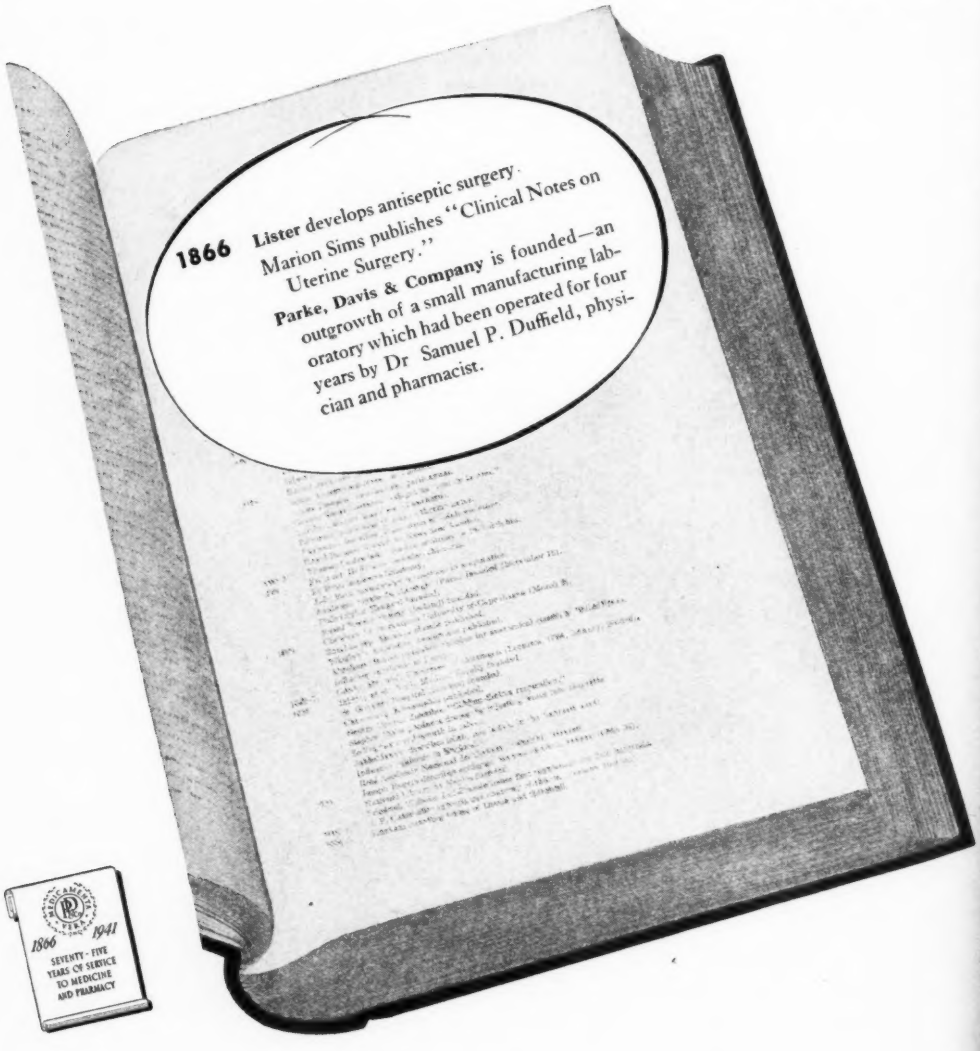
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